Adjustments to changes in fisheries law and economics

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PREPARATION OF THIS DOCUMENT

In preparation for the World Conference on Fisheries Management and Development, FAO asked 26 authors to provide papers on how their countries had adjusted to changes in resources availability, the extension of national jurisdiction and the economic changes taking place in the last decade. An analysis of the 26 papers was prepared by Barbara C. Cleveland, Consultant to FAO, and is now available as FAO Fisheries Circular No. 783, March 1985, "National adjustments to changes in fisheries law and economic conditions".

Eight of the studies were selected for publication and appear in this document.

ABSTRACT

Since the early 1970s, there have been significant changes in the conditions governing the exploitation of marine fishery resources. These changes include the generalized extension of national jurisdiction over fisheries to 200 nautical miles; the decline in the rate of growth of world catch and the growing evidence of limits to supply; and the changes in economic conditions including the rise in fuel prices and the economic recessions. These changes have had significantly different effects on different countries. This document contains case studies of the effects on eight countries: Argentina, Australia, Cuba, Kiribati, Malaysia, Morocco, Norway and Poland.

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ARGENTINE FISHERY ACTIVITY IN LIGHT OF THE MAIN EVENTS WHICH HAVE RECENTLY AFFECTED IT

by

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1. BACKGROUND - THE 1960 DECADE

The fishery sector's development began essentially in 1922 with the inauguration of the port of Mar del Plata and the settlement of migrant fishermen from Europe after the First World War. Until the 1960's, a fleet of only 15 deepwater ocean vessels of over 100 GRT engaged primarily in supplying fresh seafood products and canning for the internal market. The canning industry was the most developed at that time but its growth had become stagnant because of increasingly costly raw materials, including tin, and due to an oversized and antiquated coastal fleet.

In the 1960 decade the industrial processing of fillets and fish meal production for the internal market stimulated rapid expansion. Landings doubled from 85 200 tons in 1960 to 172 100 in 1965 including a proportional increase in the catch of hake (from 36 100 to 76 600 tons).

In 1966 the fishery reached it peak level of activity for the decade with 211 100 tons landed, mostly due to a record 68 089 tons of castañeta for the fish meal industry. The catch for this species was twice as high as that for the immediately preceding and following years, and was not reached again because of over-fishing by foreign fleets operating in the area.

A process of investment in fleet and plant was started, adding larger capacity deepwater vessels more suitable for the demersal fishery and for supplying fish to the processing industry. This became the basis for the fishery development in the following ten years replacing the fishmeal industry. The latter, in face of the exhaustion of castañeta and better utilization of other species for direct consumption, went into a marked decline in 1968 and had been reduced to utilization of offals of the fillet industry and low value bycatch.

In this connection, it is worth comparing the figures for 1961/64 and 1965/69 which reflect the higher rate of growth recorded in the later compared to the earlier period (see over page).

It can be seen clearly that the average annual amounts were significantly higher in the second five years of the decade than in the previous four years, and the difference would certainly be greater if 1960 data were included.

Concerning the fillet industry's development in the decade, chilled fillet production rose from 5 200 tons in 1962 to 17 300 tons in 1965 with production doubling in

ANNUAL AVERAGE	1961/64	1965/69
total landings (thousand/t)	103.4	186.9
coastal fleet (thousand/t)	50.3	76.6
deepwater fleet (thousand/t)	53.0	90.0
exports (thousand/t)	3.0	10.5
exports (million/US$)	0.9	2.5
deepwater vessels included during the period:		
- quantity	4.8	7.8
- GRT (thousand/t)	0.7	1.0
- storehold capacity (thousand cases)	4.9	8.3

1964 compared to the previous year (16 700 tons compared to 8 000 tons respectively). Of outstanding importance for the future consolidation of this development was the repeal of a Buenos Aires municipality regulation prohibiting marketing of fish filletts in the capital.

Processing of frozen products also reached more substantial figures in this decade: 8 100 tons in 1965, subsequently reduced due to the drop in exports.

Although the volume of exports remained low in this period, they began to acquire significance and possibilities began to emerge for frozen products as their share in the total increased. At the same time the promulgation of Decree No. 6361/67 in 1967 started a trend for export of chilled fresh fish (mainly of hake) to Brazil through direct landings in the port of Rio Grande by Argentine fishing vessels (3 600 tons in 1968 and 2 800 tons in 1969). In the following decade this was to be a solution to prevent periodic saturation in the port of Mar del Plata and an alternative to maintain the level of fleet activity at times when world demand was falling and the internal economic situation of the Argentine Republic was making competition abroad more difficult.

The breakthrough abroad opened up new prospects for development of the national fishery which had previously been limited by a small internal market accustomed to consumption of an abundant and relatively cheap supply of good quality red meats.

In 1964, official interest in the activity began to emerge, although slowly and uncertainly, as was reflected in a law allowing fishing vessels to purchase fuel at "bunker" prices and the inclusion of the fishery industry (eg. investments in refitting) among those eligible for tax and customs duty reductions. In 1966 the UNDP/FAO and the Argentine Government started a Fisheries Development Project. In 1967 a Fisheries Promotion Law was passed establishing tax reductions, allowing import of new fishery vessels free of customs duties, and prescribing that fuel used by national fishery vessels shall be exempt from all taxes. This law's importance lay mainly in the expectations it aroused, since no project has been implemented as a result of it and the only real benefit it provided (which continues in part at present) was tax-free fuel.

To sum up, it can be said that the 1960 decade marked the point of departure of Argentine fishery development, after the failure of the scheme based on the fish meal industry and in face of the opportunities offered by the external market.

2. CONSOLIDATION OF FISHERY ACTIVITY

Increased internal demand called for an effort which the fisheries industry seemed unwilling to make, in light of the food habits of the population and the additional investments required in the wholesale, retail and transport stages. Operators therefore adhered to the previous 100/130 ton catch level for domestic consumption and resolutely undertook expansion based on the external market. They were encouraged by the growing demand for substitutes of cod (a species which showed clear signs of over-exploitation and whose catches in North Atlantic had been declining from the maximum reached in 1968 - almost four million tons), and the prospects for Argentine hake which was under-exploited at the time.

Thus the growth of activity in that decade was touched off in response to signals from abroad, that is, higher demand at rising prices. This was due at first to the gradual exhaustion of fishing grounds and later to the revolution involved in the generalized extension of national sovereignty to 200 nautical miles. The former resulted in an addition of fishing vessels to the national fishing fleet, and the latter to the formation of joint-enterprises as well. We shall discuss this second phase in another section.

For the above-mentioned reasons the process of investment in fleet and plants, which had started slowly in the preceding decade, was accelerated. There was an increase from 40 small-scale filletting refrigeration vessels and plants in 1969 to 50 in 1975, with production capacity of 401 tons of fillet daily (in one shift) and freezing capacity of 755 tons daily (see Table 1). In the meantime, between 1970 and 1974, 78 boats totalling 24 300 GRT were added to the deepwater fleet. Most of these vessels were imported at favourable prices because of the quantity of boats for sale from countries which found it necessary to cut fishing effort. During 1973 and 1974, 57 of the total 78 boats mentioned were added to the fleet, most of them used. They were imported under a decree of 1971 allowing an exemption from payment of customs duties. In addition, their purchase was facilitated by a law of that year (Law No. 19.000) that allowed a reduction of taxes for 8 or 10 years on a decreasing scale for investment activity. The large quantity of applications submitted up to the last day of 1973 (the deadline for requesting the tax reduction) clearly indicated the interest shown by the private sector. Although many projects failed to be implemented because of the 1974/76 crisis, this promotion measure was the base of the activity's growth. In this connection, it may be mentioned that 52 projects for starting or expanding activity were considered as deserving approval.

The above-mentioned investment effort was financed mainly by credit and reinvestment of profits (increased by the tax exemption) and to a lesser extent by new capital. It was concentrated almost exclusively in Mar del Plata and based on processing facilities concentrating mainly on hake.

The results of the investment can be seen in the statistics on landings and exports (Table 2) which grew at an astounding rate until the international crisis which began to be felt around the middle of 1974. Total fleet landings rose from 169 000 tons in 1969 to 267 000 in 1974, with a maximum of 270 000 tons in 1973. The deepwater fleet increased its captures by 92 percent between 1969 and 1974; and the coastal fleet by 18 percent. The coastal fleet reached its highest level of activity in 1973 with 112 500 tons. During this period, hake landings rose steadily from 58 800 to 162 200 tons (Table 3) at an annual growth rate of 22.5 percent. At the time, this species was undoubtedly considered the main factor in the fishery's future, especially as the exploitation level was only slightly above one-fifth of the estimated M.S.Y.

During the same period exports rose from US$ 2.8 million (of which US$ 0.8 million was chilled or frozen products) to US$ 33.6 million (of which US$ 24.2 million was chilled or frozen products), an annual growth rate of 64 percent (97.7 percent for chilled or frozen products). The increase in volume reached an annual rate of 49.5 percent and 76 percent for total exports and chilled or frozen products respectively. Of the

Table 1

Production Capacity

	1975	1981
FACTORIES:		
Fillets (per 8 hours)	401 tons	611.4 tons *
Heads off and gutted (per 8 hours)	n.a.	120 tons *
Minced (per 6 hours)	-	55.4 tons *
Chilled and frozen products	n.a.	114.5 tons**
FREEZING:		
- Blocks (per 12 hours)	-	674 tons *
- Tunnels (blast freezing) (per 12 hours)	755 tons	1,156 tons *
- Not classified	-	182 tons**
Fish meal (per day)	273 tons	249 tons *
Canned fish (thousands of cansper 24 hours)	2.055	2.854
Salted (in brine) (per year)	21,707 tons	4,100 tons *
Salted-dried (per day)	93 tons	n.a.
Cold storage:		
- Frozen products	20,220 tons	77,190 tons
FACTORY AND FREEZER VESSELS:		
- Freezing capacity per day (tons)	n.a.	1,475 tons
- Cold store capacity (m^3)	n.a.	54,000 m^3

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* Mar del Plata, Necochea and Bahia Blanca only

** Excluding Mar del Plata, Necochea and Bahia Blanca

Source: Junta Nacional de Carnes, Direccion Nacional de Pesca Maritima e Instituto Nacional de Investigacion y Desarrollo Pesquero

Table 2

Marine Fisheries in the Republic of Argentina

YEAR	LANDINGS IN '000 TONS			EXPORTS				IMPORTS			
	long-distant fleet	coastal	total	Volume in '000 tons		Value in US$ millions		Volume in '000 tons		Value in US$ millions	
				frozen products	total exports	frozen products	total exports	fish meal	total imports	fish meal	total imports
1960	n.a.	n.a.	85.2	n.a.	n.a.	n.a.	n.a.	-	1.1	n.a.	n.a.
1961	38.0	39.3	77.4	n.a.	n.a.	n.a.	n.a.	-	3.2	n.a.	n.a.
1962	41.0	41.2	82.2	n.a.	3.5	n.a.	0.6	-	2.5	n.a.	0.9
1963	57.3	53.0	110.3	n.a.	10.0	n.a.	1.3	-	1.9	n.a.	0.7
1964	75.8	67.8	143.6	n.a.	4.6	n.a.	0.8	1.5	4.7	n.a.	1.7
1965	102.2	69.9	172.1	n.a.	2.2	n.a.	0.2	14.0	20.0	n.a.	4.5
1966	135.7	75.3	211.1	2.5*	13.2	0.6*	2.8	3.2	10.7	0.7	3.9
1967	122.8	72.2	195.1	3.1*	17.2	0.6*	4.1	0.0	4.4	0.0	2.2
1968	99.6	87.4	187.1	6.0*	11.1	1.0*	2.5	5.7	11.5	0.8	1.9
1969	90.8	78.3	169.1	3.2*	8.7	0.8*	2.8	5.4	10.6	0.9	4.0
1970	106.3	79.5	185.8	8.2*	12.9	2.8*	4.8	3.7	7.4	0.7	4.0
1971	114.2	87.5	201.7	10.3*	14.1	4.2*	5.7	13.9	18.9	2.9	6.6
1972	119.4	92.0	211.4	23.2*	28.0	7.1*	9.0	10.4	15.3	1.9	4.3
1973	157.6	112.5	270.1	25.8*	38.9	11.4*	20.7	0.0	2.9	0.0	1.8
1974	174.1	92.6	266.7	38.3	64.9	21.8	33.6	0.0	4.5	0.0	6.2
1975	124.2	74.8	199.1	24.1	58.5	11.2	19.4	0.0	6.5	0.0	7.1
1976	173.6	82.6	256.2	64.1	113.1	35.4	48.5	-	1.3	-	2.4
1977	272.0	97.4	369.4	112.3	158.2	71.3	89.3	0.0	9.7	0.0	7.1
1978	366.7	137.4	504.1	177.3	216.1	140.7	159.1	0.0	9.2	0.0	9.9
1979	451.1	99.1	550.3	214.3	248.7	194.7	213.8	0.3	11.3	0.1	18.3
1980	291.3	85.6	376.9	133.1	161.3	123.0	143.0	0.0	13.9	0.0	24.3
1981	268.2	83.7	351.8	131.8	147.3	123.0	134.4	0.6	14.5	0.3	25.8
1982	375.9	83.8	459.6	217.3	232.0	173.5	184.9	-	12.7	-	13.9
1983	330.5	70.6	401.1	n.a.	186.5**	n.a.	163.7**	n.a.	n.a.	n.a.	n.a.

Source: Servicio Nacional de Pesca y Dirección Nacional de Pesca Marítima

** Provisional figures   * including chilled products

Table 3

Landings of main species by the marine fishing fleet

(in '000 tons)

	Hake	Anchovy	Mackeral	Squid	Red porgy	Croaker	Macrodon	Grouper	Lobster	Others	TOTAL
1960	36.1	11.2	15.0	0.6	1.5	1.4	1.8	0.1	0.3	17.2	85.2
1961	34.4	10.7	9.7	0.3	1.3	1.3	1.4	0.1	0.3	17.9	77.4
1962	38.2	8.5	8.1	0.5	1.3	1.2	1.7	0.2	0.4	22.1	82.2
1963	52.3	12.5	11.6	0.4	1.7	1.2	1.6	0.1	0.4	28.5	110.3
1964	70.9	17.1	9.6	0.5	2.1	1.6	2.4	0.9	0.3	38.2	143.6
1965	76.6	16.6	9.9	0.4	2.1	2.0	2.3	0.3	0.3	61.6	172.1
1966	68.5	11.0	16.1	1.0	3.1	1.8	3.0	1.1	0.4	105.1	211.1
1967	75.7	13.4	11.2	2.3	2.5	4.7	7.0	1.9	0.2	76.2	195.1
1968	72.2	32.2	15.6	2.9	2.8	4.1	5.1	1.9	0.3	50.0	187.1
1969	58.8	15.5	12.2	0.9	1.8	4.9	5.4	2.6	0.4	66.6	169.1
1970	87.4	13.6	9.5	1.3	2.1	4.8	4.3	2.5	0.2	60.1	185.8
1971	92.0	20.5	13.8	1.7	1.8	3.5	2.4	5.5	0.3	60.2	201.7
1972	102.8	41.1	6.1	1.6	1.7	3.1	4.6	1.8	0.2	48.4	211.4
1973	151.4	34.3	12.0	3.9	3.6	3.3	5.8	2.6	0.1	53.1	270.1
1974	162.2	30.4	7.8	4.9	1.4	2.7	3.9	1.7	0.1	51.6	266.7
1975	109.0	19.2	8.9	4.1	1.7	3.6	2.0	1.4	0.2	49.0	199.1
1976	174.9	20.4	0.5	7.5	2.9	5.2	4.0	1.7	0.1	39.0	256.2
1977	281.8	21.8	1.0	2.2	7.9	3.9	2.1	4.0	0.1	44.6	369.4
1978	341.2	16.1	0.4	59.0	12.9	4.5	3.6	5.0	0.0	61.4	504.1
1979	374.2	19.8	0.5	83.6	10.7	4.4	5.7	4.9	0.0	46.5	550.3
1980	277.3	10.7	0.8	9.1	8.8	6.5	9.0	12.7	0.7	41.3	376.9
1981	228.7	12.4	1.6	10.6	15.3	13.6	8.3	16.2	2.6	42.5	351.8
1982	281.9	10.1	2.1	38.8	8.6	16.8	15.0	24.3	7.7	54.3	459.6
1983	256.9	10.6	5.2	28.7	6.7	18.1	7.1	10.9	18.5	38.4	401.1

Source: Servicio Nacional de Pesca y Dirección Nacional de Pesca Marítima chilled or frozen products, have was the almost exclusive component as it had partly replaced the world supply of cod whose catches in the North Atlantic had been decreased by about 850 000 tons due to the overfishing and the imposition of the necessary conservation policy.

The main destination of Argentine exports between 1970 and 1972 was the United States which purchased about US$ 2.5 million per year of boneless hake fillet blocks. This was exceeded by West Germany and France in the following two years (see Table 4); while the share of Italy (headed and gutted hake) and Brazil (chilled hake), and to a lesser extent, Spain (pickled anchovy and frozen products) increased.

Hake was not a wholly satisfactory substitute for cod. It was accepted because of the reduced supply of the latter and the consequent rise in price which brought up the prices of hake and other substitutes making their capture profitable. This was a matchless opportunity for the Argentine product to expand and penetrate the world market. Although there were other substitutes on the market, such penetration was not difficult since the exported volumes were not large compared to the totals of chilled and frozen fish in world trade, which showed a favourable tendency fluctuating between 2 and 2.8 million tons for values between US$ 1 and US$ 2.2 thousand million.

3. THE PETROLEUM CRISIS

Because of the situation described so far and the fact that the recent investment in plants was mostly directed to export all growth shifted to exports, so that the activity became heavily dependent on the ups and downs of the world market.

The year 1974 began with excellent prospects. However, they were frustrated by the world crisis which began to be felt in the Argentine fisheries sector during the second quarter of the year.

Japan had flooded the United States market with low priced frozen pollack blocks. This displaced the other suppliers who struggled to place their products on the European market, saturating it too and provoking a generalized drop in prices.

In addition, the price of petroleum was undergoing high and repeated increases, set by the producers through agreements reached in OPEC. Freight rates started to increase, causing a drop in export prices for perishable products which must be transported in cold storage holds. To avoid balance of payments problems, the European industrialized countries were faced with a choice between importing fuel, necessary to keep their industries going, or foods, which they could produce internally. The choice was obvious: they reduced their external food purchases, including fish.

The strong competition on the world market and the excess supply caused a drop in prices, which entered a downward spiral as this excess supply struggled to find buyers. In Argentina, there was a frantic race to sell off the accumulated stock and by collecting payment for the shipments to meet maturity dates on debts contracted to expand installed capacity. The frozen fillet price, which at the beginning of the year came to US$ 900/1 000 per ton (FOB) in round figures, dropped to US$ 450 for fillets with few bones (US$ 520 for boneless fillets) at the end of 1974. This provoked a major crisis in the national fishery industry.

The magnitude of the crisis is shown by the fact that during the last eight months of 1974 - in spite of the record exports achieved that year (US$ 21.8 and US$ 33.6 million for frozen and total fish respectively) - only 52 percent of annual total export

Table 4

Destination of Argentine Exports of Fishery Products

(in US$ millions)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Spain	0.2	0.3	2.3	2.3	3.0	1.2	2.1	11.5	31.7	41.7	25.8	31.9	40.9	19.9*
Japan	0.9	0.6	0.7	0.6	0.5	1.2	1.2	7.2	27.8	35.6	7.2	18.7	19.7	16.1*
Nigeria	-	-	-	-	-	-	n.a.	0.7	2.2	2.4	10.8	17.0	19.5	15.4*
United States of America	2.5	2.3	2.6	1.5	4.3	3.0	11.4	12.4	17.3	24.6	15.4	12.6	18.9	20.5*
Brazil	0.2	0.2	0.3	0.8	3.8	6.6	10.0	11.4	15.2	29.5	18.7	7.9	11.1	4.4*
France	0.0	0.0	0.2	1.6	4.7	0.5	1.7	9.2	9.1	9.9	6.9	4.9	10.1	9.3*
Italy	0.2	0.3	0.6	1.1	3.7	2.2	3.9	7.4	11.6	9.9	8.5	15.0	9.9	12.3*
Federal Republic of Germany	0.0	0.5	0.9	3.7	6.3	1.4	4.3	5.9	12.8	12.1	9.5	4.5	7.0	3.4*
Iran	-	-	-	-	-	-	n.a.	0.2	0.7	-	-	2.3	5.9	- *
Iraq	-	-	-	-	-	-	-	-	-	-	-	-	5.8	2.3*
Cameroon	-	-	-	-	-	-	-	-	0.0	0.0	-	0.4	5.1	1.0*
Portugal	-	-	0.2	0.4	0.3	0.2	n.a.	1.1	0.8	0.4	0.2	1.5	4.3	0.4*
Republic of Korea	-	-	-	-	-	-	-	-	6.3	10.4	0.2	0.0	3.6	2.8*
Egypt	-	-	-	-	-	-	-	-	-	-	-	-	3.1	1.9*
Israel	-	-	-	0.1	2.3	0.9	n.a.	-	3.4	4.7	3.5	3.4	2.8	3.4*
Zaire	-	-	-	-	0.7	0.3	n.a.	0.7	0.4	0.6	1.3	0.6	2.7	2.6*
Taiwan	-	-	-	-	-	-	n.a.	-	1.1	6.8	3.1	0.1	2.1	0.5*
South Africa	0.0	0.0	0.0	0.0	-	0.0	n.a.	-	0.0	-	0.5	0.3	1.7	1.6*
Saudi Arabia	-	-	-	-	-	-	n.a.	0.1	1.1	1.8	1.7	1.0	1.6	1.5*
Congo	-	-	-	0.0	-	-	-	-	0.0	0.2	-	0.3	1.0	1.7*
Puerto Rico	-	-	-	-	-	0.0	-	-	0.2	0.1	0.5	0.6	1.0	0.1*
Canary Islands	0.0	-	0.0	0.0	0.2	0.2	n.a.	0.8	0.8	1.9	4.8	0.9	0.9	0.4*
Czechoslovakia	-	-	-	0.0	-	-	2.5	3.9	1.6	4.6	3.8	1.5	0.9	1.3*
Greece	-	0.0	0.0	-	1.3	0.5	n.a.	-	2.0	4.8	4.0	1.1	0.8	1.2*
Others	0.8	1.5	1.2	1.9	2.5	1.2	n.a.	16.8	13.0	11.8	16.6	8	4.5	12.5*
Total	4.8	5.7	9	14.0	33.6	19.4	48.5	89.3	159.1	213.8	143.0	134.5	184.9	163.7**

Source: Dirección Nacional de Pesca Marítima

N.B: * First 10 months of 1983

** Provisional annual total for 1983

value could be shipped, thereby decreasing plant and fleet activity.

It should also be noted that the external factor was not the only one that caused this situation. In fact, the petroleum crisis had profoundly shaken all economies either directly or indirectly. Although Argentina was self-sufficient in petroleum, as a food exporter it also faced balance of payment problems as its exports, especially of meat, were reduced. The resulting decrease in foreign exchange earnings made the export sector more vulnerable, widening the gap between the exchange rate governing exports and that of the "parallel" market to whose evolution producers in general adjusted prices including, of course, those of fishery inputs. As a result internal costs grew at a higher rate than the local currency devaluation rate, at first eliminating the profitability of export activity and subsequently causing losses. Adjustments through reimbursement, although they tended to correct the cost-earnings imbalance, systematically arrived late.

Although the Junta Nacional de Carnes (National Meat Board) continuously took care of the fishery sector, it was beset by the difficult problems of red meat refrigeration and it did not make sufficiently strong efforts to draw the attention of an economic team which was doubtful about the future of fisheries in Argentina.

Following the UNCLOS III meeting in Caracas in June-August 1974, Argentina was repeatedly visited by trade and technical cooperation missions from the major fishing powers. Although their purpose was more general, their programmes included fishery items, primarily fishing in Argentine waters through some kind of agreement. The fishery policy in force at the time prohibited foreign investment in the sector and legislation reserved fishing exclusively to vessels flying the Argentine flag. Therefore, negotiations could not be undertaken in a way that would interest the foreign party. Argentina invariably suggested that if other countries needed fish they could purchase it from Argentinian exporters.

In 1975, a marked decline in the activity, with high levels of idle capacity and low productivity, was mostly due to the internal situation with its high inflation rates and unrealistic exchange rate which obstructed a resolute production effort. The fisheries operators fell back on positions which enabled them to continue operating with the least possible loss. Many of them sought relief by landing fresh fish in Rio Grande (Brazil) to keep part of the fleet in operation. This brought them sales worth US$ 2 200 000 in 1974 and US$ 4 440 000 in 1975 with a volume of 15 900 and 29 800 tons respectively.

The European Economic Commission for its part had decided at the beginning of 1975 to rigidly apply the reference prices (safety clause) for hake which were established at sufficiently high levels to displace the supply. Subsequently, it applied them in the same way every time the French fishermen protested against foreign competition. Whenever this measure was applied it obstructed export of partly boned hake fillets to West Germany and France.

Around the middle or end of 1975 the world situation began to improve. However, the national industry could not take advantage of this because the crisis in the internal economy persisted and tended to intensify.

Nevertheless, 16 units totalling 8 362 GRT and store-hold capacity of 7 500 m^3 were added to the deepwater fleet. Two were boats which could remove offals and heads, and freeze onboard, with a total store-hold capacity of 2 100 m^3 and 2 187 GRT.

4. NEW INTERNATIONAL SITUATION BASED ON THE EXTENSION OF SOVEREIGNTY OF COASTAL COUNTRIES

The impossibility of expanding the fishery in traditional fishing grounds and the exhaustion of important stocks led the main fishery countries, which were generally large fish consumers, to expand the range of operations of their fleets. This brought them to fish in distant waters with factory boats, processing their production onboard and transshipping it to refrigerated markets in coastal ports or on the open sea. The areas most frequented by these fleets were the North Atlantic, the North Pacific, the Eastern Central Atlantic near Africa, and the Patagonian continental shelf.

The coastal countries had gradually been extending their sovereignty over the sea beyond 12 nautical miles. The process was accelerated with the discussions in UNCLOS III which took place in 1974. There seemed to be no doubts that the legal status of the international sea would change in disfavour of the large factory fleets which had already been seriously affected by the rising fuel costs.

In light of these prospects and the increasing idle capacity and unemployment resulting from resource limitations or the restrictions which some of the coastal countries started to adopt, increasingly strong pressure was gradually brought to bear on the Argentine authorities who were unwilling to change the external investment policy or that on operation of foreign fleets.

With the change of political leadership in Argentina the organization of institutions in the fisheries sector was altered. The Subsecretaria de Pesca (Undersecretariat for Fisheries) was established under the Secretaria de Intereses Marítimos (Secretariat for Maritime Interests). This event was welcomed by the private sector which saw it as a sign of the importance attributed to the sector.

In light of the new world fishery situation and in the belief that whatever the Argentine fleet did not fish itself it must inevitably allow other countries to exploit, the Argentine Government outlined a strategy to avoid losing control over its natural resources and the exploitation of its continental shelf.

The economic scheme established, although it had some interventionist aspects, was basically liberal in character and therefore inclined to open up the economy to imports and foreign investment. The Ley de Inversiones Externas (Law on Foreign Investments) was amended to consider businesses with over 50% Argentinian resident ownership, as local businesses with national capital. As we shall see later, this allowed the formation of joint enterprises.

A development plan was worked out whose goal for 1980 was to land one million tons, of which half could be obtained by fully employing the existing idle plant and fleet capacity. Studies made previously justified the assumption that hake captures could provide 750 000 tons and the remainder could come from other species.

However, this plan was based on several assumptions which did not materialize:

1) Construction of a port in Madryn by the national government to decentralize fishery activity directing it to Patagonia and away from the already saturated port at Mar del Plata. (An exemption of customs duty on imports of vessels was already in place for Patagonia. There was no such an exemption for Buenos Aires Province); and

2) The rapid application of the benefits granted by the Ley de Promoción Industrial (Law for Promotion of Industry) and the Decrees for Southern Patagonia (1238/76) which would allow effective installation of the planned facility. It had not been supposed that the response would be so immediate and would overwhelm the capacity to provide needed inputs and services.

The extra-sectorial goal implicit in the fishery policy was to strengthen sovereignty in Argentina's zone through exploitation of its fishery resources, and to maintain its exclusivity, in the EEZ in the face of the claims of other fleets to have access to the surplus. The speed with which it was expected to attain the established target - which seemed to be entirely feasible - left unsolved some secondary aspects which were later to raise obstacles to its attainment.

To attain that extra-sectorial target of extension of catches to all of the EEZ, especially its more remote and least exploited areas, and to diversify species to be taken, it was considered that larger capacity processing vessels with freezing systems were the most appropriate, also bearing in mind the meteorological conditons prevailing in the Patagonian region.

To that end, and foreseeing that the expansion of national investment alone or combined with outside capital could obtain another 300 000 tons, it was decided to cede the remainder - 200 000 tons - to foreign operators. They would be required to form a company in the country in conformity with the national legislation, to agree to register their vessels in Argentina, and to construct plants in Patagonia for land-based processing of at least 30 percent of the catches. It was thought that this concession to foreign interests, which was implemented through international bidding, would check foreign claims to operate in the Argentine continental shelf.

The decrease of catches by foreign countries, either due to exhaustion of fishing grounds or legal restrictions, had caused prices to rise on their consumer markets. The demand for blocks, in particular, had to be satisfied to reduce idleness in foreign processing plants. This situation, in addition to a realistic exchange rate in Argentina, touched off a rapid recovery of local activity based on utilization of existing idle capacity. It resulted in a new export record of US$ 48.5 million (of which US$ 35.4 million represented frozen fish), doubling the values of the previous year.

It should be noted that in that year (1976) four traditional vessels with a total of 1 150 GRT and one freezer vessel of 1 050 GRT were added to the deepwater fleet. To this must be added another 14 traditional fishery vessels (6 175 GRT) and two freezer vessels (2 187 GRT), all registered in 1975.

In the meantime, negotiations were underway with Spain for conditions of access to that market through establishment of joint Spanish-Argentine companies. These entities would use boats of Spanish origin and their production, or part of it depending on the quotas Spain would grant, could enter that country exempt from import duties under a recently adopted Spanish law.

Spain's concern, like that of other long-distance fishery countries, was to reduce the inactivity of its fleet and unemployment of its personnel caused by low fish harvests off the west coast of Africa and the problems of gaining access elsewhere. At the same time, such access assured the supply of hake - a species especially appreciated by Spanish taste - and allowed regulation of its internal price. Spain would contribute the fleet and the market; Argentina, the resource.

A fishery agreement with Spain could not be signed because Argentina could not accept discriminatory conditions toward companies not having vessels of Spanish origin. Nevertheless, projects were accepted for forming joint businesses based in Patagonia which would operate with vessels flying the Argentine flag and would adhere to the other established fishery policy lines.

In addition, lengthy negotiations were begun concerning experimental fishing. Bids submitted by a consortium of Japanese businesses and another of German firms were considered the most suitable and won the international competition. This entitled them to undertake experimental fishing up to 100 000 tons each south of the 40^{o}S parallel during one year, with the possibility of a permanent agreement later on. In the middle of 1978 operations started with two factory boats flying the Argentine flag and one research vessel per consortium executing a jointly agreed upon plan.

When the operation was completed, only one local enterprise - a subsidiary of NIPPON SUISSAN - was formed. This enterprise is operating two factory vessels and has an industrial plant to be inaugurated shortly in Puerto Deseado. Establishment of a joint German-Argentine firm, although not yet implemented, was also approved to operate three vessels and an industrial plant in Puerto Madryn.

In addition to the research conducted by the German and Japanese scientific boats, the competition enabled Argentina to have two research ships especially constructed by INIDEP (Instituto Nacional de Investigación y Desarrollo Pesquero [Fishery Research and Development Institute]) in Japan and West Germany with the financial cooperation of both countries.

It should be mentioned that while the agreements for experimental fishing were being discussed, the flow of projects presented by Argentine companies with and without participation of foreign capital was so large that the award had already become unnecessary and even undesirable. This enabled the Argentine party not to yield even an inch since the failure of the negotiations was not a problem.

Except for the Japanese and Argentine-German companies mentioned previously and another Argentine-German firm with the same shareholders as the latter, all the rest of the firms with participation of foreign capital are Argentine-Spanish companies.

Another flow of investment into the sector came from existing operators and a small number of new investors who joined in the enthusiasm to start activities. This investment consisted mainly of credit destined for improvement of plants and expansion of their production capacity, reconditioning of the fleet and, in 1977/78, import of vessels for the Buenos Aires coast. These vessels were being offered at favourable prices because of the previously mentioned situation in the fishery countries. Their import was aided by a law exempting vessels from customs duties if the importer was the owner of a plant with idle capacity due to scarcity of its own supply, or of a damaged boat having the same characteristics, or when the product was considered to be particularly important.

In an attempt to quantify the investment it should be mentioned that the number of projects approved since 1976 by the Secretaría de Intereses Marítimos (Secretariat for Maritime Interests) was 41, for a planned total investment of about US$ 300/400 million, including plants and 86 fishing vessels with an output of 450 000 tons of final product per year. Of these, 26 projects included minority foreign participation (joint companies). To these investments should be added about another US$ 200 million without subsidy for renovation of plants and vessels in the traditional fishery sector and expansion of their production.

These investments resulted in a massive addition of vessels: 63 between 1976 and 1979 and 31 from 1980 to 1983, with 53 595 and 14 375 GRT respectively. Of these, 18 freezer ships (15 310 GRT) and 16 factory vessels (32 798 GRT) were imported during the first period mentioned and two factory ships of Japanese origin (6 547 GRT), one freezer ship (1 517 GRT), and five fishing vessels with frozen product store hold (2 500 GRT) during the second period.

The sector's production capacity (Table 1) reached no less than 611 tons of fillets per daily eight hour shift (52 percent more than in 1975), 120 tons of gutted products with head removed (mechanized), 55.4 tons of "minced" products per shift and 114 tons daily of products chilled or frozen in Patagonia for which we have no breakdown. These figures do not include the output of processing vessels which in 1981 had a theoretical daily freezing capacity of 1 475 tons. Land-based plants during the same period increased their freezing capacity by 166 percent, being able to freeze 674 tons every 12 hours by contact freezing, 1 156 tons/day by tunnel (forced air) freezing, plus 182 tons in Patagonia. In 1981 store capacity for frozen products was 77 000 tons in land-based cold rooms (excluding Buenos Aires) and 54 000 m³ on board.

The activity's growth was explosive for the short time it was required. Between 1976 and 1979 total and deepwater fleet landings grew at an annual rate of 29 and 37.5 percent respectively reaching 550 000 and 451 000 tons in the last year mentioned, a level it has not been able to exceed since.

Total exports of fishery and of frozen products increased considerably in value and volume (Table 2). Exports reached another record with 214 000 tons of frozen products for a value of US$ 195 million and total fishery products with 249 000 tons for a value of US$ 214 million. Besides reflecting this explosive growth, these rates indicate the larger proportion of frozen products and the better prices obtained. Over one-third of that volume and value came from frozen fillets (76 600 tons/US$ 83.8 million), and one-quarter (66 000 tons/US$ 58.5 million) from squid.

During this period, hake landings doubled reaching 374 200 tons in 1979, the year in which those of squid rose to 83 600 tons due to the large Japanese demand for that product.

Concerning exports, the most significant item continued to be fillet, although it had lost some of its share in the total during 1978 and 1979 due to the large export of squid and the increase in volume of gutted fish (the main products of the Spanish-Argentine factory and freezer vessels) (Tables 5, 6 and 7)

The main purchaser of fillets in 1979 was the United States which bought products worth US$ 21 700 000 (25 percent of the total), followed by Brazil (US$ 15 900 000). (Table 5). Spain was the main importer of whole and gutted fish (US$ 24 900 000 of the total worth US$ 49 100 000). (Table 6). About fifty percent of the squid was destined for Japan (US$ 27 400 000 of total US$ 58 500 000). (Table 7).

Globally, the main destinations of Argentine fishery products in 1979 were Spain with US$ 41.7 million (20 percent of the total), (Tables 4 and 8), followed by Japan (US$ 35 600 000 - 17.5 percent - mainly squid), Brazil (US$ 29 500 000 - 14 percent - for frozen fillets and chilled whole hake landed in Rio Grande by Argentine fishery vessels), and the United States (US$ 24 600 000 - 11.5 percent - fish block). In other words, the four main importers of Argentine fishery products represented 63 percent of exports - an acceptable diversification of markets.

Table 5

Exports of frozen fish fillets by country of destination

(in US$ millions)

	1974	1975	1976	1977	1978	1979	1980	1981	1982
United States of America	4.0*	2.9*	not available	10.4	13.9	21.7	13.2	9.6	10.1
Brazil	1.1*	1.1*		4.0	7.3	15.9	8.8	3.6	7.4
France	3.2*	0.3*		6.8	6.4	8.5	5.0	3.0	6.5
Federal Republic of Germany	6.2*	1.3*		4.2	10.3	8.8	9.2	3.4	6.0
Spain	0.2*	1.0*		2.6	3.7	6.5	5.6	2.1	3.7
Japan				0.4	1.2	1.8	0.4	4.9	3.5
Egypt				-	-	-	-	-	2.6
Israel				2.7	3.1	4.1	3.0	2.7	1.9
Italy				1.3	2.0	2.6	2.8	2.2	1.0
Others				11.7	11.8	13.9	16.5	5.4	5.3
Total	14.7	6.6	17.4	44.1	59.7	83.8	64.5	36.9	48.0

* Compiled according to total fisheries products exported by Argentina in 1974-75

Table 6

Exports of frozen, whole and gutted fish and shell fish by country of destination (in US$ millions)

	1977	1978	1979	1980	1981	1982
Nigeria	0.7	2.2	2.4	10.8	16.9	19.4
Spain	7.5	13.4	24.9	14.1	16.4	16.4
Iran	-	-	-	-	1.7	5.9
Iraq	-	-	-	-	-	5.2
Cameroon	-	-	-	-	0.4	5.0
Japan	5.0	4.6	4.1	5.1	11.5	4.6
Portugal	0.2	0.4	0.0	0.0	1.3	4.2
Italy	4.6	7.2	4.3	3.7	9.4	3.7
France	1.2	2.2	0.7	1.4	1.2	1.9
U.S.A.	0.5	1.7	0.5	0.6	1.2	1.8
Saudia Arabia	0.1	0.9	1.6	1.5	0.9	1.4
Brazil	0.9	1.3	3.6	2.7	1.3	1.2
Congo	-	0.0	0.0	-	0.3	2.0
Others	3.9	3.6	7.0	8.7	6.1	5.0
Total	24.6	37.5	49.1	48.6	68.6	77.7

Table 7

Exports of frozen squid by country of destination

(in US$ millions)

	1977	1978	1979	1980	1981	1982
Spain	0.6	14.3	9.0	3.3	5.4	8.8
Japan	0.0	18.1	27.4	0.1	0.1	4.8
Republic of Korea	-	6.3	10.4	0.4	0.1	3.4
U.S.A.	0.0	0.0	0.2	-	0.0	2.0
Italy	0.0	0.9	1.7	0.2	-	0.8
Others	0.1	2.7	9.8	3.4	0.1	2.2
Total	0.7	42.3	58.5	7.4	5.7	22.0

Table 8

Percentage of exports of Argentinian fisheries products by country of destination

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Spain	4.2	5.3	25.6	16.4	8.9	6.2	4.3	12.9	19.9	19.5	18.0	23.7	22.1	14.8
Japan	18.8	10.5	7.8	4.3	1.5	6.2	2.5	8.1	17.5	16.7	5.0	13.9	10.7	12.0
Nigeria	-	-	-	-	-	-	n/a	0.8	1.4	1.1	7.6	12.6	10.5	11.4
U.S.A.	52.1	40.4	28.9	10.7	12.8	15.5	23.5	13.9	10.9	11.5	10.8	9.4	10.2	15.2
Brazil	4.2	3.5	3.3	5.7	11.3	34.0	20.6	12.8	9.6	13.8	13.1	5.9	6.0	3.3
France	0.0	0.0	2.2	11.4	14.0	2.6	3.5	10.3	5.7	4.5	4.8	3.6	5.5	6.9
Italy	4.2	5.3	6.7	7.9	11.0	11.3	8.0	8.3	7.3	4.5	5.9	11.2	5.4	9.4
Federal Republic of Germany	0.0	8.8	10.0	26.4	18.8	7.2	8.9	6.6	8.0	5.7	6.6	3.3	3.8	2.5
Iran	-	-	-	-	-	-	n/a	0.2	0.4	-	-	1.7	3.2	-
Iraq	-	-	-	-	-	-	-	-	-	-	-	-	3.1	1.7
Cameroon	-	-	-	-	-	-	-	-	0.0	0.0	-	0.3	2.8	0.7
Portugal	-	-	2.2	2.9	0.9	1.0	n/a	1.2	0.5	0.2	0.1	1.1	2.3	0.3
Republic of Korea	-	-	-	-	-	-	n/a	-	4.0	4.9	0.1	0.0	1.9	2.1
Egypt	-	-	-	-	-	-	-	-	-	-	-	-	1.7	1.4
Israel	-	-	-	0.7	6.9	4.6	n/a	-	2.1	2.2	2.4	2.5	1.5	2.5
Others	16.5	26.2	13.3	13.6	13.9	11.4	n/a	24.9	12.7	15.4	25.6	10.8	9.3	15.8
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100

5. THE CRISIS

As has been stated earlier, internal consumption of fish in the Argentine Republic is small. It is stable with a catch level of 100/130 000 tons annually. Today this is sufficient to guarantee an adequate minimum base of operation to allow the industry to confront the international crises which periodically affect the activity and which are rapidly transmitted to all markets by world trade. This situation gives the fisheries sector a heavily dependent and, therefore, vulnerable character.

In Argentina's case, the main exploitable resource is hake. This is a species which, except in Spain whose population really appreciates it, and to a lesser extent in Italy, is sold in the form of white fish blocks used in the industry as a raw material for a product sold retail "disguised" as breaded (Milanese) cutlet prepared in different ways.

It was therefore logical that the largest influx of outside capital to the Argentine fisheries sector should be from Spain whose investors made an advantageous bargain. On one hand they acquired partners to utilize vessels which were idle with high fixed costs and who, at worst, would help them to sustain part of the loss. On the other hand, they obtained a better supply.

As could be foreseen from the outset, the decrease of the Spanish fleet's fishing effort in its traditional fishing grounds reduced its catches much less than proportionately. Argentina's hourly yield was much higher than that of South Africa where this fleet had been fishing. The units of the joint companies established in different countries increased the supply and cut the price. Any operator will try to sell his own product first, before those in which he only has a share as a partner. That is exactly what the Spanish party in the joint enterprises did. Although import quotas were not notably reduced, various strategems were employed as, for example, delaying distribution of the quotas between the different companies when the market was sufficiently supplied to achieve the purpose.

In 1978 Spain had become the main purchase of Argentine products, that is, headed and gutted hake, frozen on board vessels which had flown the Spanish flag and which now belonged to the joint companies. Its share in the export total fluctuated between 18 and 24 percent during the 1978/82 period. It was the almost exclusive market of the processing vessel fleet which entered the country after 1977.

In 1979 the Spanish buyers began to drastically reduce (50 percent) the price of smaller cuts - which are a large proportion of Argentine hake catches - and then to raise obstacles to their import, requiring that the product be transported in merchant vessels flying the Spanish flag or demanding higher percentages of Spanish crews on factory boats. The value of exports to Spain, which had exceeded US$ 40 million in 1979, fell to US$ 26 million the following year as a consequence of the decrease in purchases and then - in addition - due to the ensuing financial difficulties of the joint companies.

On top of all these misfortunes, the outstanding squid harvest obtained during 1978 and 1979 and mostly placed in Japan at prices which reached speculative levels could not be repeated in 1980 in face of the saturation of that market.

The preceding four paragraphs describe how the processing boat sector of the joint companies entered a profound crisis, in addition to sharing the economic problems suffered by the Argentine Republic's exports in general. This aspect will be discussed later.

In 1978 the interest rate in the United States started to rise. This tendency could also be observed in the rest of the major world economies which were confronting growing inflation in addition to balance of payments problems caused by the need to import petroleum. Thus, Argentina witnessed the start of a crisis which became progressively acute to the point where it caused recession and unemployment.

The price of fishery products, which had reached high levels, stabilized with the prospect of a downward tendency. The high interest rates led to selling off stocks.

In the Argentine Republic, the fisheries sector was indebted due to the investment effort that had been made for expansion. This indebtedness continued to rise after the middle of 1979 in face of the need to finance operating losses deriving from disparity in the evolution of the rate of exchange and the evolution of internal costs which were being adjusted according to the non-agricultural wholesale cost index. This imbalance was caused mainly by manipulations of the exchange rate and interest rates to reduce inflation.

Between April 1978 and August 1979 (16 months), while the value of the dollar had doubled, wholesale prices increased by only 3.5 percent.

Financing of losses was obtained through loans adjustable on the basis of the non-agricultural wholesale price index, in face of a deteriorating sales income which was based on factor/price distortions of the dollar. The debt grew to the point where its financing cost became unbearable. Companies were losing their working capital and the possibility to continue contracting debts because they had their assets tied up in loan guarantees.

Adjusted according to the evolution of the internal inflation rate (non-agricultural wholesale prices), the real value of the dollar in April 1978 was A$ 0.22, in June 1979 A$ 0.13. In December it was A$ 0.11; in June 1980, A$ 0.10; and, in December of that year, A$ 0.086. This means that real income per dollar of sales had fallen in December 1980 to two-fifths of its value in April 1978.

At the same time, the massive purchase of squid by Japan in 1979 from Argentina and other countries which had begun its exploitation (Canada, New Zealand, etc.) was not repeated in 1980. This, together with the previously mentioned reduction of hake purchases by Spain, aggravated the situation of the companies owning processing boats. During the second half of 1980, 75 percent of the processing fleet was idle for economic reasons.

In June 1980 the larger refrigeration plants in Mar del Plata were working at 50 percent of installed capacity, while the traditional fishing fleet was operating at 33 percent.

In the second semester of 1980 it was calculated that fishery companies needed to refinance about US$ 140 million overall and needed an additional US$ 50 million for operating capital. Furthermore, it was necessary to adjust the exchange parity to restore the sector's profitability.

The only favourable aspect shown in 1980 was the beginning of trade with Nigeria. Coastal fish and frozen whole hake were exported there that year for a value of almost US$ 11 million. This operation, whose prices produced profits, made it possible to keep part of the deepwater fleet in operation.

In December 1980 the change of economic management in the Argentine Republic created new expectations, at least concerning the future of dollar-peso parity. This expectation was confirmed and from the third quarter of 1981 the disparity between the evolution of the exchange type and the inflation rate began to narrow. This brought some relief to the situation and shifted the centre of attention to solution of the financial problem, which had become especially grave with about 30 companies under summons by creditors and generalized suspension of payment.

The negotiations for refinancing the debt went on for almost all the rest of the year. Creditor bank clubs, led by the official banks, were formed and toward the end of that year and the beginning of 1982 the situation was resolved for many companies. They obtained refinancing of their debt and long-term development loans to pre-finance exports (in reality granted to rebuild the working capital of production units) guaranteed by the National Treasury for an amount of about US$ 43 million.

6. REVIVAL OF THE SECTOR

The Mar del Plata sector revived almost immediately, succeeding in the last quarter of the year (1981) in exporting 40 percent of the annual total of US$ 134.4 million. The recovery process was slower for factory and processing vessels which again had not been able to place any large quantities of squid.

The main purchaser was Spain, which increased its share to 24 percent with US$ 32 million. It was followed by Japan with almost US$ 19 million, as a subsidiary of NIPPON SUISSAN, began to operate in June and export for a value of US$ 6.9 million.

During 1982 a considerable overall level of activity was attained in spite of the financial problems of trawl fishery, whose debt had also been refinanced. Landings came to 460 000 tons reflecting the increase of the deep seas fleet (including processing vessels) which landed 376 000 tons.

We should mention the importance of shrimp catches (7 700 tons), in particular, allowing improvement in the economic situation of shipowners working with this high commercial value species.

Total exports came to US$ 185 million (86 percent of the record figure reached in 1979). The outstanding items were US$ 24 million for shrimp (of which US$ 11 million went to Spain), US$ 22 million for squid and US$ 19.4 million for coastal fish and frozen hake to Nigeria. Furthermore, the first sizeable sales of products like those requested by Nigeria were made to Iran, Iraq, Cameroon and Egypt (US$ 6,6,5 and 3 million respectively).

7. THE PRESENT CRISIS

In April 1983 the upward trend which fishery activity had established reversed again. Several factors that touched off the situation can be recognized. It is believed that the main one was the strong competition developed against Argentine products in their traditional markets by the production of an enormous quantity (40) of foreign factory ships which fish in the continental shelf outside the EEZ and, presumably, in many cases also inside it. It is estimated that in 1983 they captured about 270 000 tons, part of which they marketed in Europe and Japan at bidding prices forcing the Argentine product out of the market. It should also be kept in mind that as they exploited the same population, their fishery significantly affected the Argentine fleet's harvests and profitability.

Secondly, financial problems stemming from the previous crisis persist, making it difficult to obtain new loans at a regulated rate (fixed by the Central Bank of the Argentine Republic). Although the free market rate has fallen in the past two months, it has remained decidedly high, at prohibitive rates, in real terms.

The aftermath of the conflict in the Southern Atlantic still persists. The 150 mile exclusive zone imposed by Great Britain around the Malvinas (Falkland) Islands prevents fishing by Argentine factory ships which used to capture southern hake there. These vessels now engage in shrimp fishery in the absence of better alternatives, a situation which in spite of the drop in the volume exported has not resulted in a proportionate decrease in the value of this product.

8. OTHER CONSIDERATIONS

It is especially important for Argentina to find some solution to the issue of fishing by foreign vessels along the boundary of the 200-mile limit on the Patagonian continental shelf and its slope.

The fishing effort expended in that area is exerted on the same population as that exploited by the Argentine fishing fleet. Therefore any regulation measure which the coastal country may apply in its EEZ will be useless if it can not control activity outside the zone.

The Argentine Republic is able to exploit the level estimated as maximum sustainable yield of hake and associated species with its own fleet. If it does not do this now or in the near future, it is not because it lacks fishing capacity but because problems of a temporary nature are affecting its economy. It is hoped that they will shortly be solved.

Because of this, any additional fishing effort would result in a lower harvest of the resource, loss of profitability, and possible over-exploitation of various species for which the coastal state is responsible.

The generally destructive nature of fishery extraction by factory vessels in uncontrolled international waters is well known. The renewability of the resource in the short term seems not to concern the shipowners, as is shown by the exhaustion of a number of fishing grounds. The mobility of a factory ship allows, or formerly allowed, it to move to more productive areas. In addition, because of its limited versatility the factory ship becomes a destructive element since it makes a selection of the catch on board and discards those species and sizes unsuitable for the product being processed at the time, even when the discards have commercial value.

To correct this unsound practice and also provide for Patagonia's development, Argentina has set construction of land-based factory installations as a requriement for the establishment of joint companies, as well as national ones, to operate in Patagonia. The measure is intended to ensure rational exploitation of this renewable resource, since it is believed that a large investment which excludes mobility of the factory will tie the shipowner to the plant's location and, therefore, he will be more concerned with conservation now of that which will be his source of income in the future.

It is felt that efforts must be made to increase local consumption of fishery products so as to eliminate or reduce the present heavy dependence on the external market.

To do this it will be necessary to break the vicious circle of low demand due to scarce supply and vice-versa. If the internal market were to reach a sufficient minimum size, this by itself would probably bring further increases of volume in its wake by creating economies of scale which do not occur at present. Such a development would allow the exporter to negotiate with more peace of mind, free from the pressures imposed by his present dependency.

The regulations in force should be extended to allow current projects to be implemented within a reasonable time. Otherwise, these projects should be cancelled and the fishery resource which then becomes available should be reallocated among the numerous requests which today can not be considered because total allowable catch of the commercially important species has been reached. This is the situation of the licence holders, among others, of fishing licences for 100 000 tons of hake issued at the end of 1983 who were required to construct vessels in the country. It should be mentioned that requests for licences to fish slightly more than an additional 150 000 tons of hake had been postponed so as to be issued as and when some vessel withdraws from the fishery or some planned shipbuilding does not materialize.

To shorten the time lapse until catch capacity becomes available pending the construction of the vessels mentioned above, or others to replace withdrawn units, or those for anchovy or tuna (except bonito); a law is under study to allow chartering of vessels similar to those under construction for the time necessary to complete the work, set at a maximum of three years, at the end of which the chartered fishery vessel would lose its temporary national flag and fishing licence.

9. PROSPECTS

As was already demonstrated during the 1974/76 and 1979/81 crises and will be in the present one as well, Argentina has a fishery management sector capable of striving by all legitimate means available to it to adjust and adapt to changing circumstances and to set its stamp on its business and way of life and to plan for its future regardless of the sacrifices this may involve, never thinking of abandoning its activity. It is like the captain who never abandons his ship.

The installed capacity discussed in this work, although its criteria are theoretical and given in maximum terms, justifies us in saying that the Argentine fishery industry - fleet and plants - is prepared and hopes that internal and world conditions will be favourable so that it can rationally exploit its fishery resource to the full and offer the world that which is not needed for domestic consumption.

RECENT DEVELOPMENTS IN THE AUSTRALIAN FISHING INDUSTRY

by

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1. INTRODUCTION

1.1 History

The Australian fishing industry can be separated into two sectors: the domestic sector, which has been historically located close to the major population centres in the south-east; and the more export-oriented sector involving mainly crustaceans, which are high-unit value species located largely in the northern and western sectors.

In 1968 Australia extended its fishing zone to 12 miles. Generally, only Australian vessels were permitted in the zone and inshore fisheries were developed with little competition from foreign interests. Fisheries jurisdiction was further extended in 1979 to 200 miles. The expanded Australian Fishing Zone (AFZ) now covers approximately 9 million square kilometres, greater than the Australian land mass and one of the largest fishing zones in the world. Within this zone over 6 000 species of fish and shellfish have been recorded. However, the waters around Australia are low in nutrients and contain few upwellings. The poor environment has restricted the availability of marine resources and has been an important factor in limiting commercial exploitation to a relatively few species.

1.2 Main fisheries

There are eight main fisheries in Australian waters:

a) Northern Prawn Fishery (NPF) is the most valuable fishery. The value of production of the NPF in 1982/83 was A$ 88.9 million or 61 percent of total Australian production. Total landings were estimated at 10 750 tonnes, comprised of 53 percent tiger (*Penaeus esculentus*), 25 percent banana (*Penaeus merguiensis*) and 21 percent endeavour prawns (*Metapenaeus endeavouri*).

The fishery extends from Cape Londonderry (WA) east across northern Australia to Bowen (Qld). A total of 466 vessels operated within this zone in 1983. Most vessels are less than 19.0 m in length. Over the last three years the number of vessels operating in this fishery has fallen, due mainly to reduced catches in the Queensland east coast sector.

Most of the product from the NPF is exported to Japan; very little is marketed domestically.

b) Western Rock Lobster Fishery: The 1982/83 landings of rock lobster in Western Australia were valued at A$ 85 million. The record catch of 12 600 tonnes constituted 69 percent of total Australian production.

The fishery lies off the coast of Western Australia from Shark Bay to Cape Naturaliste. Approximately 800 vessels operate the fishery, with most vessels being between 7.5 and 13.5 m in length.

The major export market for this fishery is the United States, although a significant trade in live rock lobster is developing with Japan and South East Asia.

c) Southern Rock Lobster Fishery: Rock lobster landings from the southern rock lobster fishery totalled 5 210 tonnes in 1982/83 valued at A$ 46.2 million. Of this, 2 572 tonnes were landed in South Australia, 1 888 tonnes in Tasmania and 750 tonnes in Victoria.

The fishery lies around the south eastern part of the continent from Streaky Bay (SA) to Wilson's Promontory (Vic) and around Tasmania. About 550 boats are licensed to operate in the fishery.

While a substantial proportion of the catch is exported, particularly from South Australia and Tasmania, the fishery does provide the main supply of lobsters for the domestic market. The major export market is the United States.

d) Scallop Fishery: In 1982/83 the scallop fishery was the fourth most valuable Australian fishery, with total landings estimated at 34 600 tonnes and valued at A$ 25.8 million.

The fishery extends from Shark Bay in Western Australia around the southern coast of Australia to Queensland. However, it is basically concentrated in south eastern Australia.

Approximately 50 percent of the catch is sold on the domestic market. The principal overseas markets are France, the United States and Hong Kong.

e) Abalone Fishery: Australian abalone production for 1982/83 was estimated at 6 427 tonnes, valued at A$ 20.5 million. This was a reduction of 12 percent from 1981/82 and in part due to voluntary catch limitations imposed by divers.

The fishery lies in coastal waters of NSW, Victoria, Tasmania, South Australia and Western Australia. Approximately 600 divers and crewmen are engaged in the fishery, using vessels of 5-7 m in length.

Almost all of the catch is sold overseas, principally to Japan and Hong Kong. Australi now produces about 33 percent of total world catch.

f) South Eastern Trawl Fishery: The south eastern trawl fishery has an annual output of about 18 000 tonnes worth A$ 17 million. Principal species are gemfish (*Rexea solandri*), redfish (*Centroberyx affinis*), morwong (*Nemadactylus macropterus*, *N. douglasi*) and flathead (*Platycephalus bassensis*, *P. caeruleopunctatus*, *Neoplatycephalus richardsoni*, *N. speculator*).

The fishery extends from central NSW in a south and then westerly direction to South Australia, including the coastal zone adjacent to Victoria and Tasmania. A significant proportion of the catch is taken from the deeper waters of the continental shelf and slope. Approximately 180 vessels are engaged in the fishery, most being between 15 and 20 m in length, although the average length is increasing.

The fishery is the principal source of Australian fish sold on the Sydney and Melbourne markets. A small quantity of Australian school whiting (*Sillago bassensis*)from this fishery is exported, mainly to Japan.

g) Southern Bluefin Tuna (SBT): Approximately 50 percent of the world SBT catch is taken in the AFZ. Australian production of southern bluefin tuna was estimated at 21 300 tonnes in 1982/83. This was valued at A$ 13.1 million.

The fishery extends from Jurien (WA) in a south and easterly direction to Port Macquarie in NSW, although production in Victoria and Tasmania is of minor importance. The Australian fleet numbers about 155 vessels, mainly pole-and-line, although approximately 25 percent of SBT is taken by five purse seine vessels operating in conjunction with the pole-and-line vessels. Japanese distant-water longliners operate in the eastern part of the fishery.

A substantial proportion of the SBT catch is canned and sold on the domestic market, although some is exported whole to markets in Italy and Japan. A small but increasing quantity is being shipped to the Japanese sashimi market.

h). South Eastern Shark Fishery: The south-eastern shark fishery produced 6 589 tonnes in 1981/82, valued at A$ 8.6 million. Principal species are school shark (*Galeorhinus australis*) and gummy shark Mustelus *antarcticus*).

The fishery extends from the western boundary of South Australia to the NSW/Victoria border and includes the waters off Tasmania. The exact number of boats operating in the fishery is not know.

Shark is exclusively sold on the domestic market, principally in Victoria.

The east coast prawn fishery, which is largely export oriented, is another major fishery. Oyster production is also important off New South Wales and pearls are produced off Broome in Western Australia and in Torres Strait.

The major foreign-based fisheries in waters adjacent to Australia are the Japanese tuna longline fishery (10 000 tonnes taken from the AFZ) and the Taiwanese pair trawl and gillnet fisheries off northern Australia (18 000 tonnes and 7 000 tonnes respectively).

2. EFFECTS OF CHANGES CAUSED BY THE NEW REGIME OF THE SEAS

2.1 Fleet characteristics

Australia has no distant-water fleet and as a result there has been no displacement from foreign zones. Some operations in Torres Strait may have to be modified once arrangements for sharing the resources in the Strait with Papua New Guinea are in effect.

The proclamation of the 200 mile zone coincided with a period of high and stable prices with the subsequent high profits encouraging further investment in a number of Australian fisheries. This was particularly evident in prawns, tuna and other fin fish. The resultant fleet expansion accentuated the over-capitalization and over-capacity problems. This expansion is exemplified in the south eastern trawl fishery in which,despite boat numbers increasing from 88 to 132 from 1973 to 1981, the overall catch showed little apparent increase. A similar situation developed in the east coast prawn fishery, where boat numbers virtually doubled between 1978 and 1981 with the proportion of vessels larger than 15.24 m rising from 28 percent in 1971 to 39 percent in 1981.

2.2 Catch trends

Most of the growth in fisheries production since the proclamation of the AFZ in 1979 has taken place in Australia's traditional fisheries. Between 1979/80 and 1982/83 production rose by 25 percent to an estimated 165 600 tonnes. In the same period nominal value rose 24 percent to A$ 429.6 million, nearly four times the value in 1972/73. Landings of molluscs were up to 98 percent to an estimated 50 720 tonnes. This was largely due to a massive increase in scallop landings, a species prone to wide natural fluctuations in numbers.

While increases in catch have occurred, no dramatic changes have taken place as a result of the declaration of the AFZ. Most of the increase which has occurred has been due to significant increases in the capital invested in fisheries and greater exploitation of previously developed resources. Very few new resources have been identified.

3. EFFECTS OF RESOURCE LIMITATIONS

3.1 Developed fisheries

Generally, Australian fish stocks are considered to be fully exploited. Evidence suggests that most developed fisheries are suffering from over-capitalization with some stocks being at risk in a commercial sense. The southern bluefin tuna fishery would appear to be most vulnerable. Biological evidence has indicated that the present level and composition of catch is placing this resource at risk of being fished to commercial extinction. However, most other major Australian commercial fish species are not biologically endangered although most fisheries suffer from over-capitalization, indicated by low rates of return and poor profitability.

As a result of these conditions, management regimes, with the basic aim of preventing further exploitation and capitalization in the short term, are being discussed for most of Australia's major fisheries. The longer-term objective is to develop an economic, efficient and substainable industry.

3.2 Undeveloped fisheries

A number of fisheries show limited biological potential for future expansion. These include northern demersal trawl and pelagic resources, southern deepwater trawling and pelagic resources (including mackerel and pilchards), tuna (other than southern bluefin), and south eastern squid resources.

4. EFFECTS OF GENERAL ECONOMIC CONDITIONS

4.1 World economic conditions

In recent years world economic activity decreased and Australia, along with most nations, was affected by the general recession. Since a major portion of Australia's crustacean and mollusc seafood produce is exported, the world recession reduced profitability in a number of the fisheries. The continuation of the economic recoveries of the United States and Japan should assist Australia's major export commodities in the short term, although the continued rise in costs may reduce the competitiveness of these commodities in the medium to long term.

4.2 Australian economic conditions

Since 1980 there has been a downturn in economic performance of many of the major fisheries. Costs, particularly fuel and interest rates, have risen sharply without a compensatory increase in returns. Fuel prices rose 110 percent between 1979 and 1982 and are expected to increase in real terms by one percent per year throughout the decade.

Over-capitalization is evident in a number of fisheries as increasing catching capacity has not resulted in a commensurate increase in catch. Prices on overseas markets have stabilized or are increasing very slowly. The rising costs and increased competition on both domestic and export markets has placed many operators in an increasing cost/price squeeze. Australia's competitiveness for some major export commodities has been eroded.

5. MARKETS

5.1 Overseas markets

In value terms approximately two-thirds of the Australian catch, predominantly high-valued shellfish, is exported. Australia supplies 35 percent of the American spiny lobster market and about 7.5 percent of the Japanese prawn market. Generally Australia is a 'price taker' on the export market. The exception is abalone, where Australian producers effectively influence prices. Between 80 and 90 percent of the abalone consumed in the main market, Japan, is supplied by Australia. The market is prone to periodic over-supply but, following such a glut in 1982, voluntary catch restraints on the part of Australian producers has affected the stock holding in Japan and Hong Kong and these actions have been effective in stabilizing the market.

5.2 Domestic markets

Australian seafood consumption is not high, owing to the availability of other protein sources. Per capita consumption has remained relatively steady (6.9 kg/person/year) over the past five years, despite a peak of 7.4 kg/person/year in 1980/81.

Over half of the seafood consumed in Australia is imported, largely from South Africa, New Zealand and Japan. About 80 percent of prepared fish and 60 percent of fresh and frozen fish are imported. The quantity of fresh and frozen fish imported increased steadily to a record of 38 986 tonnes in 1980/81. New Zealand provided 24 percent of imports in 1978/79 and has increased its market share to 35-37 percent over the past four years. Under the terms of Closer Economic Relations Agreement between Australia and New Zealand in 1982, New Zealand Government export support schemes were phased out. The Australian domestic market continues to attract large quantities of New Zealand fish. More recently, the high prices and the acceptability of New Zealand products on the American market has caused a diversion of products from Australia.

5.3 Government involvement

Government intervention is largely confined to export product inspection, research, and the management of the various fisheries. Domestic marketing authorities have been established in New South Wales and Queensland.

6. ADJUSTMENTS IN POLICY AND STRATEGIES

6.1 Policy for the AFZ

With the proclamation of the AFZ in 1979, the Australian Government adopted the policy that exploitation should be to the benefit of Australia and its fishing industry. Preference was given to development by Australians. The primary objectives of administration of the AFZ are to conserve and manage fish resources to ensure the stocks are not placed at risk while resource usage in the fishing industry is optimized.

Australia recognizes its obligations under the Law of the Sea Convention to permit access to the AFZ by foreign vessels to fish for any resources surplus to Australian harvesting capacity. It is the policy of the Australian Government to favour joint ventures as a means of providing access to foreign vessels. Guidelines for joint ventures were announced in 1980. They are basically aimed at developing new fisheries using foreign vessels, crew and/or expertise. Proponents are required to provide for 50 percent Australian equity in the venture with foreign involvement ultimately being replaced by Australians.

Where Australian fishermen cannot harvest resources and there are no acceptable joint venture proposals, the Government may approve bilateral fishing arrangements. Under such arrangements, foreign fishermen are granted access to the AFZ subject to payment of a fee based on a percentage of the market value of the authorized catch and compliance with Australian regulations. Agreements are subject to annual renewal.

Jurisdiction over waters up to three miles from the coast lies with State governments, while the Commonwealth Government exercises control over proclaimed waters extending from the three mile limit to 200 nautical miles offshore. The Commonwealth Government has jurisdiction over all foreign vessels in the AFZ. However, the Offshore Constitutional Settlement enacted in February 1983 allows State and Commonwealth governments to enter into agreements on the management of specific fisheries. These agreements may be implemented jointly or by the Commonwealth or State governments alone, thus rationalizing consultative procedures and management administration. Due to the change in Government in 1983, work on the fisheries element of the Settlement has been suspended pending a revision of arrangements for exercise of Australia's sovereignty.

6.2 Management measures

The terms of the Commonwealth Fisheries Act 1952 (as amended) include the following:

(a) to ensure "through proper conservation and management measures, that the living resources of the Australian fishing zone are not endangered by overexploitation; and

(b) achieving the optimum utilization of the living resources of the Australian fishing zone" (Sec 5B (a and b)).

However, management responsibility is shared by both State and Commonwealth governments, as indicated above.

A number of management initiatives relating to fisheries encompassing both Commonwealth and State waters have been developed recently. Most of these management regimes have been designed to limit the development of already over-capitalized industries. These management initiatives are designed to control the resources which enter the fishery to reduce present fishing capacity. Most established fisheries have some form of control, typically licensing and gear restrictions. Limiting the licences frequently encourages rapid upgrading of equipment and therefore fishing capacity. As a result other controls including mesh size, vessel replacement, gear design, and closures have been used to supplement management, although these have proved only partially effective.

Two new management regimes widely discussed are the adoption of transferable units of fishing capacity, combined with measures to retire units, and the adoption of individual transferable vessel catch quotas.

In the southern bluefin tuna fishery, scientific evidence has strongly suggested that the parental biomass has been significantly reduced and there is a risk of recruitment failure. Southern bluefin is a highly migratory species which is exploited by fishermen from Australia, Japan and New Zealand. Action to meet the problem of depleted stocks can only be carried out through a cooperative international approach. Officials of the three countries have held two rounds of discussions on international management and Australia and Japan have both undertaken to restrain further growth in their catches pending agreement on more permanent measures.

Subsequently, Australia introduced an interim management plan for its own domestic fishery incorporating catch quotas, size limits and a range of complementary operational controls. A further strengthening of these management measures is envisaged for future seasons, including the possible allocation of individual transferable catch quotas which offer the prospect of providing an autonomous adjustment mechanism which would address the economic efficiency objective. In this respect the Industries Assistance Commission held an inquiry into the need for adjustment assistance for fishermen who are affected by such measures.

A limited entry management regime was implemented in the northern prawn fishery in 1979. This fishery has been subject to boat replacement controls since that date. The expectation that a tighter boat replacement policy would be introduced, together with a shipbuilding bounty on boats of over 21 metres, caused an acceleration in the introduction of larger vessels. Under the present boat replacement policy it has been estimated that the fleet, if upgraded to the limits set out in the policy, could increase catching capacity by 20-30 percent. This, combined with the increasing cost/price squeeze, has brought the entire management plan under review. New management arrangements which will control the total fishing capacity of the fleet, allow the transfer of units of fishing capacity between fishermen, and provide for the retirement of units in order to improve long-term efficiency, are now being developed. Management developments in the northern prawn fishery are likely to directly affect future management of the east coast prawn fishery off Queensland.

6.3 Financial support

Financial assistance to the fishing industry is similar to that afforded other areas of primary production with a few minor exceptions. A recent Industries Assistance Commission Inquiry into the industry concluded that the Rural Adjustment Scheme (RAS) should not be extended to the general fishing industry in its present form. The IAC recommended that adjustment assistance should only be considered in conjunction with the overall manag ment regime for individual fisheries and that assistance measures should be developed in an overall scheme which would address the fundamental long-term problems in the fishery.

Recently the IAC commenced an inquiry into whether adjustment assistance should be provided for the southern bluefin fishery. This is in line with policy to consider assistance on a case-by-case basis and is a result of management measures recently introduced to the fishery.

STUDY ON THE ECONOMIC SITUATION OF THE CUBAN FISHERIES

by

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SUMMARY

This paper deals with the economic situation of the Cuban fishing industry and how it has been affected by the new international oceans of the regime, shrinking fishery resources and international economic conditions.

The annual catch of the Cuban fishing industry totals nearly 200 000 tons. Of this total, 75 000 tons are caught in Cuban coastal and inland waters and the somewhat more 120 000 remaining tons are caught on the high seas and within the EEZ of other coastal States.

Coastal marine fisheries in Cuba have developed at a constant rate with no significant changes traceable to recent events in the world's fisheries. The catch of the ocean-going trawler fleet, which represents over 50 percent of the national total, has remained stable at approximately the same level since 1976. However, this stability represents a slowing of the growth rate which had characterized the Cuban catch since the sixties. Drift longlining and ringnetting for tuna, an exclusively high-seas fishery, continue to produce highstable yields. Aquaculture has grown at an accelerated rate, particularly in recent years. Lastly, the shrimp fishery developed by Cuba outside its territorial waters vanished in 1979 as a result of the new restrictions on fishing areas.

Problems caused by the new fisheries regulations which now bar fishing by other nations in areas where the Cuban fleets formerly operated, the rising prices of fuel, gear, material and imported inputs, and payments for fishing rights have all combined to drive up the production costs of the Cuban fishing industry.

The Government's response to this situation has been to alter the national fisheries development strategy. The new strategy aims at maximizing utilization of Cuban marine and inland fishery resources so as to guarantee sustained fisheries development while maintaining catches of the distant-water fleets operating outside the Cuban EEZ at acceptable levels.

Also included in the new strategy is the goal of introducing more sophisticated processing of fishery products for better utilization of the raw material and for increasing the value added of trade commodities. Another new goal is better utilization of national facilities for building and repairing vessels, producing gear and equipment and providing technical services to the fishing industry.

This paper looks at the results achieved as a result of the new fisheries development strategy, pointing out certain long and short-term development trends.

1. INTRODUCTION

The establishment of a new international regime of the oceans recognizing the right of nations to exercise sovereignty over fishery resources located off their coasts up to 200 nautical miles is one positive step toward the establishment of a new economic order, inasmuch as it makes it possible to exercise more equitable control over marine resources (FAO, 1981). However, the changes producted by the new regime do have different repercussions in different countries. The West African countries for example and those South American countries with coasts on both the Atlantic and Pacific, just to mention a few, have greatly benefitted from these changes because they enjoy abundant fishery resources off their coasts. Other countries which do not have vast fishery resources, particularly those with distant-water fishing fleets, are now having difficulties developing their fisheries.

The changes introduced by the new Law of the Sea coincided with a time of acute world-wide economic slump which affected nearly all countries in the world. The Third World countries in particular, given their generally frail economies and the inequalities in international economic relations were brutally and severely affected by these changes.

The establishment of the new international regime of the oceans offered no immediate advantages to Cuba, which has very limited fishery resources within its EEZ (FAO, 1983). In addition, two-thirds of the Cuban catch came from distant-water fleets fishing outside the national jurisdiction, and this led to problems of dislocation.

The Cuban fishing industry whose development had begun with the triumph of the revolution of 1959 had maintained a steady rate of growth for 20 years, primarily due to the growth of the distant-water fleet. Nonetheless, during the second half of the seventies this fleet began to experience difficulties in operating in zones under the jurisdiction of other countries. This led to a drop in yields which could not be offset by a corresponding rise in the catch from Cuba's EEZ.

The distant-water fleet could no longer continue to expand as it had in the past and so the national fisheries development strategy had to be modified. The focus now is on utilizing Cuban fishery resources. This includes a vast aquaculture development plan, the reorganization of national coastal fisheries and maintaining catch levels of the distant-water fleet at those of the late seventies.

The purpose of this paper is to examine the impact of the new regime of the oceans and international conditions on the economic situation of the Cuban fishing industry and to describe modifications in the national fisheries development strategy and the main steps taken by the Government to deal with the situation. The paper does not attempt to deal exhaustively with every possible topic,(that would require a longer paper), but instead looks at the basic features of the economic situation of Cuban fisheries.

2. THE CUBAN FISHING INDUSTRY

Any study of the Cuban fishing industry should take account of the fact that it is an economically independent sector. It falls under a ministry responsible for planning fisheries development, managing and protecting living resources and directing the various marine, inland and aquaculture fishery enterprises. The ministry also directs industrial processing, wholesale marketing and exports, the construction of fishing vessels, scientific research, data collection, fisheries training and extension services (MIP, 1977).

Small-scale coastal fisheries, aquaculture and modern oceanic fisheries all coexist within the general structure of fishing activities. Coastal fishing is done within and around the island shelf and brings together fleets specialized in fishing spiny lobster, penaeid shrimp, small tuna, various kinds of fin fish and species of molluscs, crustaceans and other shellfish.

Distant-water fishing takes place entirely outside Cuba's EEZ. It is the province of distant-water fleets specializing in ocean trawling, drift longlines, ringnetting and bottom longlines. From 1968-1979, a Cuban shrimp fleet also operated outside Cuban waters.

Table 1 shows fishing areas in which the Cuban fleet operated and catches from 1970-1982 (MIP, 1983). Table 2 breaks down catches by groups of species during the same period.

In 1958 the Cuban fishing fleet was comprised of roughly 5 000 vessels over seven metres in length (Salmon, 1963). There was a major transformation in the sixties involving a massive replacement of the old rowing and sailing craft by longer-range, more modern, better-equipped small-scale craft. At present, the fleet includes about 2 000 vessels. Table 3 breaks down the fleet structure between 1974 and 1982.

TABLE 1

Cuban distant water catch 1970-1982

YEAR	Total catch by fishing area (mt)						
	Total	North-west Atlantic (21)	West-central Atlantic (31)	East-central Atlantic (34)	South-west Atlantic (47)	South-east Pacific (87)	Inland Water (02)
1970	105.9	-	61.9	22.0	21.4	-	0.6
1971	126.2	1.2	68.0	9.0	46.0	1.2	0.8
1972	139.8	2.0	72.5	7.0	57.3	-	1.0
1973	150.3	1.2	72.9	10.6	54.2	10.3	1.1
1974	165.0	-	73.1	10.7	53.6	25.5	2.1
1975	143.6	7.5	56.9	6.7	44.6	23.7	4.2
1976	194.1	29.9	77.4	6.4	33.2	43.7	3.5
1977	189.2	18.3	70.6	20.7	33.2	42.8	3.6
1978	213.2	13.1	71.2	7.1	63.5	55.0	3.3
1979	153.9	12.5	66.2	7.5	42.9	19.5	5.3
1980	186.4	9.2	68.4	9.3	4.6	88.6	6.3
1981	164.5	6.7	59.8	8.7	-	79.0	10.3
1982	195.3	18.6	68.5	7.1	0.7	86.8	13.6

TABLE 2

Cuban catch broken down by species 1970-1982

YEAR	Total catch (mt) by group of species				
	Total	Fish	Crustaceans	Molluscs	Other
1970	105.9	86.0	13.9	4.8	1.2
1971	126.1	104.6	16.3	3.7	1.4
1972	139.8	115.4	18.6	3.7	2.0
1973	150.2	127.0	18.2	2.9	2.1
1974	165.0	139.0	21.8	2.1	2.2
1975	143.5	117.2	19.9	4.3	2.1
1976	194.1	162.8	21.7	7.7	1.8
1977	189.2	159.7	18.1	9.8	1.6
1978	213.2	187.7	20.7	6.5	1.4
1979	153.8	126.6	18.9	7.2	1.3
1980	186.5	164.0	17.2	4.0	1.3
1981	164.5	141.0	16.9	4.4	2.2
1982	195.2	170.0	19.2	4.6	1.4

3. IMPACT ON CUBAN FISHERIES OF CHANGES INTRODUCED BY THE NEW OCEANS OF THE REGIME

The changes introduced by the new international regime of the oceans caused a temporary setback to the rate of growth of Cuban catches compared to the preceding achievements. The changes, however, did not affect all fisheries in the same way. Fishing within the Cuban EEZ continued to develop normally, but fishery operations outside the EEZ were modified. Aquaculture came to contribute a greater share of the catch. But this brief resume of the situation fails to reveal the scope of the changes which have taken place in the Cuban fishing industry. We shall therefore take a closer look at individual fisheries.

3.1 Cuban coastal fisheries

Since 1959, Cuban coastal fisheries have continued to grow at a steady rate, as can be seen in Table 4.

TABLE 3

Structure of Cuban fishin· fleet 1974-1982

YEAR	Total vessels and vessels per fleet				
	Total	Oceanic trawler fleet	Tuna Fleet	Distant-water shrimp fleet	Shelf fleet
1974	1 982	18	24	125	1 818
1975	1 996	18	24	143	1 811
1976	1 978	20	24	170	1 764
1977	2 030	27	24	182	1 797
1978	2 039	36	24	123	1 856
1979	1 986	35	23	127	1 801
1980	2 034	35	23	127	1 849
1981	2 033	35	22	-	1 976
1982	2 015	35	21	-	1 959

TABLE 4

Cuban coastal catches from 1959-1982

YEAR	CATCH (mt)
1959	22.4
1960	26.1
1965	30.2
1970	39.8
1975	58.6
1980	63.2
1981	57.2
1982	66.5

From the economic and social standpoint the development of coastal fisheries has been impressive. Not only has the catch continued to expand at a stable rate, the means of production have also been modernized and labour productivity has been considerably enhanced. There has also been an extraordinarily positive change for the better in the living standards and living conditions of Cuban fishing communities.

About halfway through the seventies, most of the Cuban commercial fisheries had achieved MSY (MIP, 1981). It might have been feasible to increase the catch figures for certain specific fisheries, but there was not enough fisheries potential to develop major new fisheries.

Despite these resource limitations, the relative simplicity of coastal fishing operations left room for continued improvement in fishing techniques. There was also room for economic and social growth with this type of fishery, and this was taken into account in formulating fisheries policies. It can definitely be stated that coastal fisheries have continued to expand at a constant rate despite such recent events as the new Law of the Sea and the present world economic crisis.

3.2 Shrimp fisheries

Shrimp fishing in Cuba was traditionally practised along the coasts, with another shrimp fishery operating outside the coastal area. Shrimp fishing operations outside Cuban waters experienced major growth from 1968-1970 with the addition of 90 new vessels and 30 freezer ships, mostly fishing off the coasts of Mexico, the United States and Guyana.

The shrimping grounds available to Cuba were vastly curtailed by the 1976 regulations. Partly because of this and partly because the overall expenditure for fishing had risen due to the new fishing tax and the higher prices for inputs from abroad needed by the fleet, the shrimpers began to move in closer to the Cuban coast. Shrimp resources in national waters, however, were unable to support the capacity of the shrimp fleet. The fleet therefore had to be reorganized and some of the vessels re-geared for other fisheries within the Cuban EEZ. The vessels in worst repair were laid off.

Table 5 shows changes in the size of the shrimp fleet from 1974-1982 and includes the period of major changes in the size of the fleet.

TABLE 5

Changes in the size of the Cuban shrimp fleet from 1974-1982

YEAR	FLEET SIZE
1974	265
1975	304
1976	358
1977	386
1978	345
1979	334
1980	266
1981	259
1982	242

In 1982, the shrimp fleet was operating only in the Cuban EEZ and even the 242 vessels of which it was composed exceeded the Cuban shrimp resource potential. Fisheries management programmes therefore continued to adjust fleet size to actual resource potential.

Thus shrimp fishing outside the Cuban EEZ ceased completely as a result of the changes introduced by the new ocean regime. The economic impact was irreparable. There is no hope in sight at present that the Cuban distant-water shrimp fleet may again operate within the EEZ of other nations since shrimp resources are being fished to the limit almost everywhere in the world and there is very little margin for increase.

3.3 Distant-water fishing with bottom longline

Distant-water fishing with bottom longline is a further development of the traditional hook-and-line fishing practised by Cuban vessels during the last century off the coasts of Yucatán, Florida and other Gulf fishing grounds.

After the extension of jurisdiction in the region, bottom longline ocean fishing was confined to the Mexican coasts, (Cuba has a fishing agreement with Mexico).

The active fleet consists of forty-nine 23 metre vessels, mainly fishing grouper and snapper. A newly designed vessel for this type of fishing is now being tried out. It is more efficient than vessels presently in use and may help to upgrade the fishery.

3.4 Ocean trawl fishery

Cuba began to develop ocean trawl fishing in 1962, first using side trawlers and then highly modern stern trawlers. In 1975 there were 18 fishing vessels followed three years later by 26 new 106 metre supertrawlers. This massive incorporation of modern units was combined with a subsequent reorganization which laid off less productive vessels, resulting in a total fleet of 35 vessels in 1979.

The fleet was operating on the traditional Atlantic and southeast Pacific fishing grounds. As the fishing area shrank in response to the spread of Exclusive Economic Zones, it became necessary to relocate the fishing vessels to coastal zones of countries with which Cuba had fishing agreements and to explore deepsea areas lying outside the jurisdiction of coastal States where trawling might be feasible.

These changes, together with a drop in fishery yields in some areas such as the southeast Atlantic, caused a slump in the Cuban catch in 1979. As Table 1 shows, the figure dropped by 59.4 thousand tons, mostly at the expense of the ocean-going trawling fleet. Trawling yields picked up in later years, and came to roughly approximate the catch levels of 1976 and 1977.

It can therefore be said that the outcome of the changing international fishery situation in recent years has been a setback in the growth rate of the Cuban trawling fleet, which had known none since its inception. This has affected the overall growth rate of Cuban fisheries, as trawling was formerly a front-ranking fishery in Cuba.

Trawler trips in search of new fishing grounds have not only produced lower yields with the corresponding, negative, economic impact; there have been other economic effects. These have to do with changes in composition of catches. The trawler vessels had been using fishing techniques and on-board processing appropriate for hake and related species. In the new fishing areas they were forced to catch whatever species were allowed, primarily mackerel and other pelagic species. This required an adaptation to the new fishing situation and substantial technical changes in installed capacity on board.

3.5 Tuna

Ocean fishing of tuna and related species developed in Cuba after the acquisition of the first longline vessels in 1962.

By the end of the sixties the number of tuna vessels totalled 23 longliners and one ringnetter. This figure has remained virtually unchanged up to the present. The fleet operates in the eastern central and central Atlantic, outside the jurisdiction of coastal States.

Fishing for tuna and related species has not been particularly affected by the establishment of the new international regime of the oceans. This can be seen in Table 6 which shows the Cuban tuna catch in the central eastern Atlantic region alone. This represents virtually the full Cuban catch using drift longlines and ring nets.

TABLE 6

Cuban catch of tuna and related species in the central eastern Atlantic 1970-1982

YEAR	CATCH (mt)	YEAR	CATCH (mt)
1970	6.5	1977	6.8
1971	5.5	1978	6.2
1972	6.5	1979	7.0
1973	9.0	1980	9.0
1974	8.6	1981	6.9
1975	5.4	1982	6.3
1976	5.9		

The changes in catch figures from one year to the next can be traced mainly to changing fleet concentration in the fishing area. This is a generally stable fishery.

The Cuban fisheries development strategy during the seventies envisaged increasing the tuna catch without increasing the size of the fleet. But given the instability of a regime dependent on resources located within the Exclusive Economic Zones of coastal countries and the rising costs of naval construction, inputs and technical services from abroad, the planned growth did not take place.

3.6 Aquaculture

Generally speaking, fishing in inland waters and aquaculture are relatively new activities in Cuba. There was no tradition in Cuba of either catching or eating freshwater fish. Nor was mariculture carried out on a commercial scale.

However, the large number of freshwater dams built after 1959 for irrigation and other water uses favoured the development of inland fishing and government attention was drawn to this fact. Tilapia, grass-eating carp and other foreign species were introduced and soon became acclimatized.

Aquaculture and freshwater fishing have become a priority sector for national fishery development policy. Development of this fishery is considered one of the surest, most economically viable ways to increase the production of fish for direct human consumption.

The current trend in aquaculture development is to seed dams for later extensive fishing. A scientific research programme is being carried out in tandem with aquaculture and freshwater fish development. The objective is to solve problems of fish feeding, spawning, early growth stages and other major questions. The second step will be intensive aquaculture.

Very promising results have been achieved up to now, considering that fresh water fisheries products were not even an item in the Cuban catch statistics only a few years ago. By 1982, freshwater species had produced a figure of 13.6 thousand tons, which is quite a sizeable yield for a country the size of Cuba.

In addition, a national mangrove oyster programme is now in progress. A production method has been worked out (Nikolic et al, 1979) by which it is hoped to boost the yields of this fishery by several thousand tons per year.

Experimental rearing of species such as shrimp and mullet is now being carried out for the purpose of developing new kinds of fishery production. These experiments, however, are only expected to produce results in the medium and long term.

4. IMPACT OF LIMITED RESOURCES ON THE CUBAN FISHING INDUSTRY

Limitations of fishery resources have not had much effect on the economic picture in Cuban fisheries, as none of the national fisheries was measurably affected by this item.

The exploitation of national fishery resources has been guided by a scientifically designed management and development programme. With the exception of a few gaps detected in techniques used to monitor fisheries, which brought about the depletion of certain fish populations and other marine organisms in restricted areas of the Cuban coast (Mena, 1983), it can be stated that fishing capacity in this area has matched the fishery resource potential.

As discussed in an earlier chapter of this paper, the move back to the Cuban EEZ by shrimpers formerly operating outside of Cuba, producing an excessive fishing capacity for the shrimp resources available in Cuban coastal waters, arose from shrimp fishing restrictions established by other countries and not as a result of over-capitalization of the traditional shrimp fishery within Cuban waters.

There was however, a relationship between over-capacity and limited shrimp resources. It was impossible to deploy the vessels within the Cuban EEZ, and so about 100 shrimp vessels had to be laid off or converted, a major economic event.

Diminishing stocks or other changes connected with shrinking fishery resources in areas under the jurisdiciton of other States where the Cuban fleets used to fish have also had a certain economic impact, but not a decisive one. In the southeastern Atlantic for example, the Cuban trawler fleet had caught about 40 000 tons per year from 1970-79. By the end of this period, both the yields and the quality of the catch had dropped off and although this was not the basic reason it did help bring about the virtually full retreat of the fleet from this area in later years.

The drop in yields due to shrinking resources and the non-appearance of certain species in the hoped for quantities also had their effect. But these changes mostly affected fleet operations without any significant repercussions on the fishing industry as a whole.

5. EFFECTS OF THE INTERNATIONAL ECONOMIC SITUATION ON THE CUBAN FISHING INDUSTRY

The international economic situation had a negative impact on all sectors of the economies of the developing countries and this included fisheries. A country like Cuba, which had developed distant-water fleets operating far from domestic ports and which had to purchase vessels, gear, various equipment and technical services abroad (as these were unavailable within the country) was heavily affected by price rises abroad which have helped to drive up fishery production costs over the last few years. In addition, the Cuban fishing industry has undergone a continuous process of development for more than two decades and the industry as a whole has had to be subsidized.

More recently, the drop in c.p.u.e., the payment of licensing fees, changes in species composition, additional expenses for tanking fuel to fishing grounds, and the general rise in fuel costs and inputs, have driven up the overall cost of fishing and the economic situation of the Cuban fishing industry is more tense than before.

In discussing this issue, it should be kept in mind that profit is not a prime motive in fisheries development in Cuba. The main goals are to produce food for the people, and to generate employment. These and other social goals justify subsidies in support of the fisheries sector. Furthermore, the fact that most of the means of production are publicly owned and that economic and social development in the country is centrally planned, means that the development of the various sectors of the economy can be harmonized in such a way as to maximize economic and social benefits.

The foregoing doesn't mean it hasn't been necessary to enact heavily restrictive measures and cut corners to make the fishing industry more profitable. For instance, fishing vessels were no longer imported after 1978. From 1979 to 1982 about three hundred 10 to 23 metre craft were produced in Cuban shipyards to replace vessels or expand fisheries in national waters.

Better use has also been made of national capacity for vessel repairs. Even supertrawlers have been repaired in Cuba, a major saving for the Cuban economy, as can be seen in Table 7.

A total of US $ 5.6 million was saved on vessel repairs in this fashion. Another important aspect was the further development of national self-sufficiency.

There were other austerity measures and incentives to better utilization of national capacity in order to cope with the difficulties arising from the general economic situation. Some examples are upgraded fishery management schemes in the Cuban EEZ, more sophisticated processing of fishery products and other changes in fishery development policies. These efforts have shown that there are major productive reserves which can contribute substantially to overcome the negative impact of the international economic situation and enhance the economic viability of the fishing industry.

TABLE 7

Savings on foreign expenditure through vessel repair in Cuban shipyards

	Savings as a result of in-country repairs (by vessel)						
		Supertrawlers			Tuna longliners		
YEAR	No.	Average value (US$ 1 000)	Total	No.	Average value (US$ 1 000)	Total	Total Savings (US$ 1 000)
1979	-	-	-	3	200.0	600.0	600.0
1980	-	-	-	3	200.0	600.0	600.0
1981	6	400.0	2 400.0	3	200.0	600.0	3 000.0
1982	8	400.0	3 200.0	5	200.0	1 000.0	4 200.0
1983	12	400.0	4 800.0	4	200.0	800.0	5 600.0

6. FACTORS HAVING TO DO WITH THE FISHING INDUSTRY AND MARKETING OF FISHERY PRODUCTS

The Cuban fish processing industry has mainly concentrated on frozen fish and to a lesser extent on canning, curing and other kinds of processing.

On-shore installed capacity was 60 tons of frozen fish in 24 hours in 1970, 90 in 1975 and 128 in 1980. This capacity is used only for freezing the coastal catch and includes neither the portion of the coastal catch processed in other ways, not the portion distributed for direct consumption. Shore-based installed capacity for storing frozen fish products was 17 135 tons in 1970, 27 615 tons in 1975 and 33 825 tons in 1980.

The Cuban distant-water fleet has modern facilities for freezing and keeping frozen fish as do the other distant-water fleets. In addition, there are three shore-based canning facilities built over 20 years ago, although they have been modernized somewhat recently. Table 8 shows the output of these plants over the past 13 years. As the table shows, the amount of canned fish doubled beginning in 1980 due to the new processing strategy for fishery products.

The output of other industrial products such as fish cakes and minced fish has risen swiftly over the last few years. Production began in 1976 and by 1982 output topped 3 000 tons of finished products. Other kinds of industrial production including smoked fish and fish sausages are also part of the new trends in the processing and marketing of fish. More than 1 000 tons of these new products were distributed to the domestic market in 1982.

It is interesting to note that the Cuban people were not in the habit of eating fish. However, a greater domestic demand for fish has been created over the last 20 years through fish advertising campaigns and regular distribution of fish products to medical care centres, schools, nursery schools and other such institutions where groups of people are fed. The programme mainly targeted the youth segment of the population. A national fish distribution network was also established which made fish products available everywhere in the country, even in rural areas.

TABLE 8

Production of canned fishery products from 1970-1982

YEAR	OUTPUT (mt)
1970	1 681
1971	1 922
1972	1 736
1973	3 116
1974	2 764
1975	2 502
1976	2 541
1977	2 313
1978	2 294
1979	1 806
1980	4 329
1981	4 296
1982	5 568

In 1970, 46.6 thousand tons of fish products were distributed in Cuba and the figure for 1982 was nearly 100 000 tons.

Regarding domestic consumption, there is a marked tendency to consume less fresh fish; 17.8 thousand tons were consumed in 1970, 10.9 thousand in 1982.

The same is true of whole frozen fish. In 1970, more than 50 000 tons of whole frozen fish were distributed compared to the 1982 figure of less than 30 000. Consumption of head-off frozen fillets rose, however, from 15 000 tons in 1970 to 38.5 thousand tons in 1982. This trend is the result of more sophisticated processing facilities onshore and at sea. The goal is to make more efficient use of the raw material and increase the value added of the product.

The processing industry and fishery products market are playing a very important role in coping with the problems faced by Cuban fisheries due to changes introduced by the new regime of the oceans, fewer traditional fishery resources and the international economic situation.

In this respect, the Government's policy has been to make maximum use of national fish processing capacity so as to get more food for people out of the raw material and increase the value added of the product so it will earn more money. At the same time, another goal is to diversify the products offered to the people so as to enhance the prestige of fishery products in the national diet.

The new strategy has faced great difficulty due to the changes in species in catches landed by Cuban fishing vessels. For many years, the ocean trawler fleet (which brings in the bulk of the fish), landed mainly hake and similar species. Processing technologies had therefore been designed to process hake-type species. These products were available on the market and a definite consumer pattern had been created. But in recent years, the fleet has had to move away from its traditional fishing grounds, and species such as mackerel are more frequently landed now. Mackerel requires a completely different kind of processing and the final taste of the processed product is very different.

Freshwater fish which had had virtually no weight in the national output has come to be an important item on the local market in many inland communities in Cuba. Formerly, not only was there no small-scale appropriate technology for industrial processing of freshwater fish, there was absolutely no consumer demand for the product.

These additional difficulties are now being solved by a more flexible approach by the fish processing industry to develop new products acceptable to consumers and more intensive promotion of these new products. This has been another successful offshoot of measures to maximize national industrial processing capacity in existing plants. These plants are also being expanded at the present time to put more of these products on the market. A national network of small fish-processing plants is also being set up at the same time using appropriate technologies to prepare smoked, salted, filleted and other kinds of fish products for more efficient utilization of the raw material, greater diversification of the range of products available on the domestic market and increased value added. It is also helping to solve such problems as generating new sources of employment, especially for women, this being one major target of present-day Cuban society.

One precise development target of the Cuban fishing industry is to help meet the nutritional requirements of the people and this is why the domestic market for fish products has top priority. Products with a high intrinsic value, however, such as spiny lobster and shrimp, which can be placed on the international market after undergoing simple, low-cost processing, and tuna, which can be quality-processed by traditional methods, are all earmarked for export.

Table 9 shows the amount and value of exports from 1970 to 1982.

In the scale of the Cuban economy, these export values for fish products have constituted an inestimable contribution to the development of the country. The first to benefit was the fishing industry itself, which largely financed its own growth through fishery-generated foreign exchange.

As Table 9 shows, the values of Cuban exports of fish products have risen steadily over the last few years despite extension of jurisdiction and the international economic crisis. This is due to the fact that Cuba basically exports luxury products which bring high prices on the international market. The other important factor is that the exports are mainly made up of spiny lobster and shrimp, which are caught within Cuba's EEZ.

Exports increased between 1978 and 1980 because some lots of fin fish were put on the export market, a practice which was discontinued in subsequent years.

TABLE 9

Amount and values of exports of Cuban fishery products from 1970-1982

YEAR	EXPORTS Amount (thousands of tons)	Value (millions of pesos)
1970	14.6	19.0
1971	14.2	21.7
1972	14.6	26.2
1973	18.4	35.1
1974	24.1	49.0
1975	18.2	52.2
1976	16.9	59.8
1977	21.4	66.6
1978	38.5	85.1
1979	39.5	97.0
1980	45.9	90.4
1981	28.6	146.0
1982	25.6	148.7

Imported fish products traditionally played an important role in supplying the Cuban domestic market. During the fifties the country imported an average 18.7 thousand tons of tinned and cured products each year, a smaller amount than the figure for live landings. Subsequent import volumes varied but were always much above those of the fifties. As Table 10 shows, imports stabilized at about 40 000 tons per year beginning in 1976.

Cuba's balance of trade for fishery products is very favourable. This can be seen in Tables 9 and 10, which show import values much lower than export values.

This can be explained by a very basic component of Cuba's fishery strategy, which consists of earmarking crustaceans and other luxury products for export. This does not represent a sacrifice in terms of food supplies for the internal market, as the imported fish is cheaper, which makes it possible to supply fish to broad segments of the population.

7. CHANGES IN NATIONAL FISHERY STRATEGY

Under the Cuban fishery development strategy of the early sixties and up to the second half of the seventies, coastal resources were to be used to improve the living conditions of small-scale fishermen, and increase the production and labour productivity of small-scale fisheries.

At the same time, following the development model of various fishing countries, the policy was to establish and develop ocean-going fleets with the capacity to operate in international fishing grounds and catch fish in large quantities. Aquaculture development was not a priority item at that time.

Generally speaking the major objectives of fishery development at that time were to use the large industrial catch to meet the domestic demand for fish and to earmark luxury products for export. These products did not represent significant amounts of food so earmarking them for export meant bringing in foreign exchange which could be used to partly finance the development of the fishery sector.

Then, the fishery situation changed. Those changes introduced by the new regime of the oceans and the general economic situation, in particular, meant that the fisheries strategy had to be redefined. This was done as follows:

- Maximum utilization of the marine fishery resources of Cuba's EEZ. This involves reorganization of coastal fishing schemes plus the development of fisheries on the shelf and in the pelagic zone surrounding Cuba.

- Development of aquaculture in inland waters. The plan includes restocking fish in manmade freshwater dams in the initial phase and laying the foundations for intensive freshwater fish rearing in the long term. This is accompanied by the development of mariculture projects to produce marine species.

- Maintenance of the catch levels of ocean-going fleets. The plan is to seek fishing grounds outside the jurisdiction of coastal States. International negotiations continue on fishing agreements involving fish surpluses of other coastal countries.

- Maximum utilization of national capacity to upgrade industrial processing of fishery products so as to increase value added. Building and repairing fishing vessels within Cuba and expanding technical services to fleets as ways of minimizing the foreign expenditures of the fishing industry.

The use of fish products to supply the domestic market still has top priority. The export of fish products to bring in foreign exchange ranks second.

The basic point of the strategy is to continue development in the fishery sector, even in the short term. This will be done despite the present international economic context and despite the fact that Cuba received no immediate economic benefits from the changes introduced by the new regime of the oceans. Because of the scant potential fishery resources within its own EEZ, due to these factors, growth rates in the fishery sector will be slower than in the past.

There are now positive signs that the new strategy is beginning to produce results in the short-term. For instance, thanks to the management of national fishery resources, including changes in fishing patterns for resources within Cuba's EEZ, the spiny lobster catch has increased by over 10 percent each year, on the average, from 1978-1982. The historic catches of domestic fisheries are now surpassed by more than 2 000 tons per year. This refers to pelagic and demersal fish found in the deep waters around the island. Likewise, virtually the entire shrimp by-catch, which was formerly discarded or little used, is now being used for direct human consumption or for industrial use.

The new fisheries management policy includes strengthening monitoring mechanisms which, in turn, lead to improved conservation of fishery resources. Although there are no striking, short-term results, the biological foundation for long-term development is now being laid.

The other item, perhaps its impact is greater in both the short and longrun, selected as an objective in the move to develop fisheries by making the most of national capacity, is aquaculture. As Table 1 shows, aquaculture has increased steadily in importance. In 1982 the catch figure was 13.5 thousand tons which marks a decisive turning point in national fish production.

The catches from free entry zones and the territorial waters of other coastal States have returned to the levels of 1976 - 1977. Cuba's agreements with Mexico, Canada and other countries plus the general improvement in fleet operations encourage the hope that the yield from these fisheries can be maintained at acceptable levels and perhaps increased.

Moreover, the afore-mentioned emphasis on upgrading industrial processing of fishery products is now showing positive results. The main contribution is a general economic improvement in the fishing industry. Lastly, the austerity measures, the policy of making maximum use of national capacity for ship construction and repair, and the move to use domestic sources to supply the inputs and equipment needed by the fishing industry are also helping to cope with the difficult situation which developed in the late seventies.

Furthermore, the preparation of fishery development programmes and plans, in which the fisheries sector and its relationships with the other sectors of the national economy are thoroughly reviewed, has been effective in the short-term. Plans for the future are to reinforce the scientific basis for fisheries development through greater application of science and technology to fish processing, and the implementation and monitoring of fishery development plans. In line with this, more support is being given to development-targeted research and fisheries management within Cuba's EEZ, aquaculture and fish processing.

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THE EFFECT OF THE 200 MILE REGIME ON THE REPUBLIC OF KIRIBATI

A SUMMARY

by

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1. INTRODUCTION

The Republic of Kribati is composed of three groups of islands, the Gilberts, Phoenix and Line islands stretching over 2 000 nautical miles of the equatorial Pacific. The major resources available to Kiribati are marine since the only other major resource, phosphate, was depleted below economically feasible exploitable levels prior to independence and mining ceased in 1979. Marine resources thus represent the only potential for the country to achieve economic self-sufficiency.

Kiribati has non continental shelf. The major fish stocks are tuna, with reef and lagoon species being a minor resource in terms of commercial development.

The establishment of a 200 mile Fisheries Zone around the Gilberts group in 1978, was followed by the declaration of 200 mile Fisheries Zones around the Phoenix and Line groups. An EEZ was declared in 1983. This has given Kiribati jurisdiction over 1 015 000 square nautical miles (3.5 million square kilometres) of potentially rich tuna fishing grounds.

This extended jurisdiction has had no direct effect as yet on the development of a national fishery which is still in the very early stages. Nor can it be said that the declaration by Kiribati of a 200 mile regime has influenced the decline of the tuna fleets which traditionally exploited the areas now encompassed by the boundaries of the country's EEZ. The initial effect of the new regime has been an awareness on the part of the Kiribati Government of the need to ensure that adequate benefits are obtained from the exploitation of the country's major resource by distant water nations through access fees. Kiribati is nevertheless aware of the benefits which will ultimately accrue to the developing national tuna fishery through extended jurisdiction. These benefits will become apparent as this fishery progresses.

2. NATIONAL FISHERY DEVELOPMENT

2.1 The first stages of development

The development of a national capacity to exploit the tuna resources commenced after the declaration of a 200 mile Fisheries Zone. The need to develop such an industry in Kiribati does not stem primarily from the need to provide food for the country. A small island state like Kiribati with a land to sea ratio of 1: 6000 has never been short of food from the sea given the proximity to the food source of a population living on narrow coral strips of land. Rather the development of a national tuna fishery in Kiribati is a means to provide for economic growth, essentially through employment and revenue. As a first step Kiribati is developing a small scale pole and line industry based in the Western group, the Gilbert Islands. A national fishing company, Te Mautari Ltd, was incorporated as a private company by the Kiribati Government in 1981. The labour intensive nature of this type of activity makes it ideally suited to the development situation in the country.

2.2 Te Mautari Ltd., the national fishing company

The national fishing company started operations with two pole and line vessels of the 100 grt class. Production from the two vessels in 1981 was 500 tons. It acquired two more vessels (one 59 grt and one 20 grt) in March 1983. At the same time, there was a reorganisation of the company's operations. Production for 1983 from the four vessels was 1871 tons. This is expected to rise to 2 500 tons in 1984 as lack of cold storage space limited production in 1983. In addition to operating the pole and line vessels, the company purchases tuna from artisanal fishermen who operate outboard powered skiffs of 5-6 metre in length fishing for tuna using the traditional method of pole and pearl shell lure. Production from this sector has risen from 270 tons out of a total production for the company of 2 300 tons. The remaining 2 150 tons were exported for canning realising a value of A$ 1.59 million.

2.3 Storage and transportation of the catch

The geographical remoteness of Kiribati and its small population (60 000) place it away from regular shipping routes. The national fishing company uses a chartered vessel to transport the product to the cannery. This necessitates onshore storage while the carrier vessel is away. The existing 120 tons of storage space is being augmented by the construction of a 100 ton capacity cold store. Additional development plans have been made for four additional pole and line vessels, 300 tons of cold storage space and the construction of a jetty. This latter will allow the catcher vessels to berth alongside a wharf to offload their catches and take bunkers and supplies. It will also enable fish for export to be loaded directly onto the carrier vessel. At present all fish unloaded has to be ferried ashore in small boats with the process reversed for loading the carrier vessel.

2.4 Further development

Pole and line development is limited to the Gilberts group by lack of bait in the othe two groups. It is further limited to eight vessels by the estimated size of the wild bait resource supplemented by cultured bait from a milk fish farm. The Kiribati Government therefore plans to develop a national purse seine fishery in order to exploit the potential of its tuna resource. While this has not commenced as yet, it is planned for the near future.

3. FOREIGN FISHING EFFORT IN KIRIBATI - THE EFFECT OF THE NEW REGIME OF THE SEAS

The waters of Kiribati have been traditionally exploited by the distant water pole and line vessels of Japan and the longline vessels of Korea, Taiwan and Japan. The Japanese fleet has paid access fees from the time of the declaration of a 200 mile Fisheries Zone in Kiribati. Neither Korea or Taiwan pay access fees at present. While there has been a reduction in the effort by these fleets, particularly those of Korea and Taiwan, this is not attributable to the 200 mile regime of Kiribati. These alterations have been caused by the economic recession in the tuna industry rather than the 200 mile regime. It can noted that in published statistics of operating costs for these fleets, access fees not appear as they are an insignificant proportion of the total costs.

Another development since the establishment of the new regime of the seas has been the growth of U.S. purse seine effort in Kiribati waters. Effective surveillance by Central and South American coastal states coupled with falling catch rates had led to the U.S. purse seine fleet moving into the Central and Western Pacific. The development of fishing techniques to catch tuna by purse seine in the Kiribati, EEZ has opened up a potentially large fishery.

4. LIMITATIONS OF RESOURCES

4.1 Domestic exploitation

Domestic capacity is not yet sufficiently developed to fully exploit the tuna resource in Kiribati waters. Given the importance of this resource to the economic development of Kiribati, it is essential that distant water fishing efffort be monitored as closely as practicable.

4.2 Exploitation by the distant water pole and line fleet

Historically the surface fishery within the Kiribati EEZ by the Japanese distant water pole and line fleet has been concentrated in the western areas, mainly the Gilberts group. Economic pressures, such as spiralling operational costs, forced a readjustment of fishing strategy. Larger vessels capable of holding more bait ventured further east after larger skipjack to produce a higher return on the voyages. Still the effort covered only a small portion of the total area.

4.3 Distant water longline exploitation

The long line fishery has ranged over most of the area encompassed by the Kiribati EEZ. Catch figures are given for this fishery in section 7. Total annual production from this sector has varied but in recent years has been averaging around 7 000 tons.

4.4 Purse seine exploitation

Purse seine fishing in Kiribati waters only commenced in 1982 with the arrival of the U.S. purse seine fleet. Prior to this, this fishing technique was not sufficiently developed to cope with the deep thermocline in the Kiribati area.

The Japanese purse seine fleet is prevented from moving east to the Kiribati zone by their domestic legislation. No evidence is available to suggest that Korean and Taiwanese purse seiners have started operations in the Kiribati area. U.S. purse seine production from the Kiribati zone in 1983 was in excess of 40 000 tons.

4.5 The skipjack resource

It is estimated that there is a standing stock of over four million tons of skipjack in the Central and Western Pacific of which at least one million tons can be harvested. The mobility of skipjack, even when spawning, and its high turnover rate means that the resource can with stand an increase in the present exploitation levels. The limiting factor for effort is likely to be market demand, which will impose a ceiling on the catch below the maximum sustainable yield.

4.6 The Yellowfin resource

Some doubts have been expressed as to the advisability of increased effort on yellowfin in the Central and Western Pacific. It has been postulated that yellowfin stocks are at, if not beyond, maximum sustainable yield. This is based on declining long line catches of this species. The U.S. purse seiners have been reporting a high proportion of yellowfin in their catches from the Central and Western Pacific.

4.7 Other tuna species

The other two species of tuna caught in commercial quantities in Kiribati are bigeye an albacore representing 10 percent and 1.5 percent of total annual production. Declining long line catches of these two would suggest they are in a similar situation to yellowfin, although in 1983 an increase in the percentage of juvenile bigeye was experienced.

4.8 Conservation requirements

It would appear at present there is no need for catch limitations being imposed withi the Kiribati zones. However there is a need for careful monitoring of catch levels by foreign fishing vessels particularly of yellowfin and bigeye. Should declining catches become apparent, then the Kiribati Government will give serious consideration to imposing catch limitations. Given the importance of the resource to the economic development of the country, a depletion of available stocks would have serious repercussions on the count development. Kiribati is carrying out this monitoring in conjunction with its neighbourin island states through a regional programme of harmonizing fishing regimes coordinated by t region's fisheries agency.

5. THE EFFECTS OF GENERAL ECONOMIC CONDITIONS ON FISHERY DEVELOPMENT IN KIRIBATI

5.1 Joint Venture development

For a small island state like Kiribati with limited capital and expertise but a potentially productive fishery, one way to start development was through the medium of a joint venture. In 1979/80, when the Government of Kiribati was exploring this possibility, economic conditions were not sufficiently favourable to attract potential partners. Interest rates were rising, as were inventories, while prices were beginning to fall.

The development path chosen by Government initially was pole and line fishing because of the high employment factor. However, existing joint venture operations in the region using this technique were experiencing economic difficulties. Furthermore, purse seine techniques had not developed sufficiently to encourage a potential joint venture partner to enter into an arrangement. Thus with the economic difficulties being experienced by joint venture arrangements with the proven technique of pole and line fishing and the experimental nature of purse seine fishing in the Kiribati area, potential partners were unwilling to take what was apparently a high risk by entering into an arrangement with the Government. Given a more buoyant economic situation, it is possible that a joint venture partner might have been interested. As it was, the prevailing economic conditions effectively closed off this avenue of development.

5.2 Interest rates and fuel costs

Given that joint venture partners were not forthcoming, the Kiribati Government decided to initiate the development of a small scale pole and line fishing industry. As infrastructure has been provided through grant aid, high interest rates have not imposed a burden on the operations of the national fishing company. On the other hand, fuel costs do. The geographical remoteness of the country and its small size keep fuel prices high. The total reliance of Kiribati on power generated through the medium of fossil fuel means that the operational cost of shore storage is high (electricity is US$ 0.29c per Kw.). This cost coupled with the fuel cost of the catcher vessels, which is 40 percent of vessels' operation costs, imposes heavy burdens on the national fishing company.

The cost of fuel in Kiribati (US$ 0.38c/litre for diesel and US$ 0.67c for petrol) also affects the artisanal sector which used outboard engine powered skiffs . The average daily consumption of 55-60 litres of petrol for one of the artisanal craft means it must catch 140 lbs of fish to cover fuel costs. Prior to the incorporation of the national fishing company, production from this sector was limited by local demand and fuel consumption was higher as the boats had to race to be first on the market. Development in this sector has been assisted by the national fishing company's purchasing all the catch at a fixed price of US$ 0.60c/kg. This price is regulated by current cannery prices as most of the production from this sector is exported. Therefore, the artisanal fishermen have been able to increase production but income are limited by the high cost of fuel and low world price for tuna. Larger diesel powered craft are beyond the incomes of the artisanal fishermen while sail powered craft cannot achieve the same productivity.

6. MARKET DEVELOPMENT

6.1 Current marketing policy

Fresh water is not abundant in coral atolls such as those which comprise the islands of Kiribati. This limitation precludes all but the most basic forms of processing. In the present early stages of commercial development, production is limited to whole frozen tuna for the canneries. The advanced technology and degree of expertise needed for sashimi production, in addition to transportation problems, have ruled out this method for Kiribati.

Transportation options are limited due to the geographical remoteness and small size of the country which does not attract regular shipping. In addition, production from the national fishery is not high at this stage (250 tons per month). Thus, at this time, market options are limited and the national fishing company has chosen to operate under arrangement with a major canner. This arrangement provides a guaranteed market for the company's production.

6.2 Transportation options

While container vessels do call at Tarawa the main port of Kiribati, the harbour is too small to allow such vessels to dock alongside. All cargo is lightered ashore to a small wharf which is too congested to permit the storage of reefer containers. In addition, shipping lines are reluctant to leave empty reefer containers for up to six weeks, which is the average period between ships. The lack of dock facilities also means that loading times required by break bulk carriers cannot be achieved. Under present conditions of ferrying the fish out by small boats, a maximum of 40 tons loading per day is achieved. Therefore, the national fishing company uses a chartered carrier vessel to transport its production to the cannery.

6.4 Market prices

When the national fishing company was incorporated in 1981 the ATSA price for frozen skipjack,which accounts for 75 percent of production, was US$ 1 050 per short ton. The recession in the tuna industry caused by high inventories and the low price of competing products has forced the price of skipjack down to US$ 700 per ton. Yellowfin in 1981 was US$ 1 200 per ton and is now down to US$ 760 per ton. This significant decrease in the price the product realises has had a serious effect on the financial performance of the national fishing company. The company managed to breakeven for 1983. Had prices not taken such a sharp downturn, the company could have enjoyed a reasonably healthy profit.

6.5 Future marketing strategy

Kiribati as a producer of small quantities of a primary product is in a weak marketing position. This is compounded by the fact that the country's major export product is in abundant supply on the world market. Together these factors have imposed limitations on marketing strategies available to Kiribati.

In the future, increased cold storage space will permit more efficient grading of the catch and construction of a jetty will increase transportation options. These developments in conjunction with increased production will allow the national fishing company to explore alternative market outlets.

7. ADJUSTMENTS IN NATIONAL FISHERIES POLICY AND STRATEGIES

7.1 Surveillance capability

Effective surveillance systems are necessary for the management of 200 mile zones. Such systems are however expensive to operate. If they form part of the armed forces of a country, the cost may be absorbed within the general defence budget. For a small island state like Kiribati the cost of maintaining effecive surveillance cover over the three areas comprising the country's EEZ is prohibitive.

Each island in the Gilberts group has an airstrip, but there is only one island in the Phoenix group with an airstrip and only one airstrip in the line group. The further limits of the Phoenix group are 450 miles away from the airstrip while the further limits of the line group are 900 miles away from the airstrip.

The Kiribati Government examined this problem prior to declaring a 200 mile zone. The costs of mounting a surveillance programme covering the entire EEZ was compared with the potential revenues from access fees and it was apparent that the cost of such surveillance would be far in excess of any possible access fees. The revenue from access fees would be totally used up on surveillance. It was decided therefore that the revenues from access fees should be used to bolster the country's budget. Any surveillance exercises mounted would be on a small scale utilising available resources rather than obtaining and maintaining specialised units and equipment.

7.2 Access Agreements

In the first year following the declaration of a fisheries zone, government to governmen agreements were concluded with Japan and Korea covering the principles of granting access to the Kiribati zone for fishing vessels of those countries. These agreements were followed by access agreements between the Kiribati Government and the tuna associations in Japan and Kore

Apart from two periods of 6 and 12 months when there was a failure to reach agreement, the access arrangements with the Japanese tuna organisations have continued. The arrangement with the Korean tuna fleet lasted for two years until 1981 when they failed to renew. Since then there has been no agreement. Attemps by the Kiribati Government to persuade the Taiwanese to sign an access agreement have failed. In 1983 the Kiribati Government acting jointly with the Maritime Authorities of the Federated States of Micronesia and Palau signed an access agreement with the American Tunaboat Association.

7.3 Conditions of Access

(a) Japan Tuna Associations

This agreement covers longline and pole and line fishing, but not purse seining. Vessels are licensed subject to the following conditions :

(i) No fishing is permitted within the 12 nautical miles territorial seas;

(ii) Catch records must be maintained on a daily basis on regionally approved catch report forms;

(iii) Vessels must report on entry to and exit from the zone;

(iv) Completed catch report forms must be submitted to the Kiribati Government within 45 days of the end of each voyage;

(v) Observers appointed by the Kiribati Government shall be taken on board selected licensed vessels;

(vi) No fishing is permitted within 1.5 nautical miles of any fish aggregating device set by the Kiribati Government;

(vii) Vessels shall comply with all relevant laws and regulations of Kiribati.

(b) American Tunaboat Association (ATA)

Under this agreement member vessels of the ATA, upon payment of an access fee, are licensed to fish within the zones of the Federated States of Micronesia, Kiribati and Palau subject to the following conditions :

(i) Vessels must report on entry to and exit from the Zones;

(ii) No fishing is allowed within the 12 nautical miles territorial seas of the three parties;

(iii) Catch records must be maintained on a daily basis on regionally approved catch report forms;

(iv) Observers appointed by the Government shall be taken on board selected vessels;

(v) Vessels shall not fish within closed areas designated by the parties;

(vi) Vessels shall not fish within 1.5 miles of any fish aggregating device set out by the Government;

(vii) Vessels shall comply with all relevant laws and regulations of the Government.

In addition to the above,consultations are held between the Parties and the ATA to review catch data twice a year.

(c) Total current revenue form the two agreements accruing to Kiribati is US$ 2 000 000 approximately (depending upon exchange rates).

7.4 Regional cooperation

As noted before, the Kiribati Government had determined that surveillance potential was extremely limited. Consequently the enforcement of access conditions was very difficult. Given this situation, it was seen that the only way to improve management of foreign fishing vessel access was through regional cooperation. Member countries of the South Pacific Forum, which comprises the independent countries of the Central and South Pacific, formed the Forum Fisheries Agency in 1979. This agency has the responsibility of coordinating the regional fisheries research and development programme, a major part of which is the harmonisation of fisheries regimes for the optimum benefit of member countries.

7.5 The Nauru Agreement

Kiribati was among the seven island states who formulated and signed the Nauru Agreement in 1982. This agreement resulted from a common concern shared by signatory states to optimise the revenue derived from access fees and to ensure the effective management of their marine resources, which to most of them represent their only resources. The Nauru Agreement through its implementing arrangements lays down minimum conditions of access for foreign fishing vessels which include :

(i) Zone entry and exit reporting;

(ii) Weekly catch reporting;

(iii) Daily maintenance of standardised catch report forms;

(iv) Carriage of observers;

(v) Standardised recognition marks;

(vi) Registration on a Regional Fishing Vessel Register.

7.6 Regional Fishing Vessel Register

The concept of a Regional Fishing Vessel Register originating in the Nauru Agreement was adopted by the entire South Pacific Forum membership becoming effective in 1983. All foreign fishing vessels wishing to gain access to any zone within the Forum region must appear in good standing on the Regional Fishing Vessel Register. Initially, all vessels applying for inclusion on the Register appear in good standing. Removal of good standing status usually follows a conviction for violating the fisheries laws of one or more Forum countries, and is effected only with the agreement of all Forum members. No foreign fishing vessel will be granted a licence to any zone within the Forum Region unless it appears in good standing on the Regional Fishing Vessel Register.

7.7 Review of Fisheries legislation

The involvement of Kiribati in the Nauru Agreement, which harmonises member countries' 200 miles regimes, has necessitated a review of the country's existing fisheries legislation. This is necessary to enable Kiribati to enforce the provisions of the Nauru Agreement. Sufficient flexibility is to be given in future legislation to allow for changing circumstances as regional cooperation develops.

8. SUPPORTING DATA

8.1 General economic data for Kiribati

Number of islands : 33 (17 in the Gilberts group, 8 in the Phoenix group, 8 in the Line group)

Population : 63 000

GDP (1982) : US$ 23 000 000

GNP (1982) : US$ 26 000 000

PCI (1982) : US$ 365

EEZ area : 1 015 000 square nautical miles

8.2 National commercial fishery production

UNIT-TONS	1981	1982	1983
National fishing company vessels	622	504	1871
Artisanal fishermen	271	195	437
Total	893	699	2308

8.3 National fishing company fleet

	1981	1982	1983
	1xpole & line 90grt	1xpole & line 90grt	1xpole & line 90grt
	1xpole & line 120grt	1xpole & line 120grt	1xpole & line 120grt
			1xpole & line 59grt
			1xpole & line 20grt
Total	2	2	4

8.4 Onshore freezing/cold storage capacity

	1981	1982	1983
(a) freezing -	1x3ton/24hr blast freezer	1x3ton/24hr blast freezer	1x3ton/24hr blast freezer 1x10ton/24hr brine freezer
Total capacity/24hr	3 tons	3 tons	13 tons

	1981	1982	1983
(b) Cold storage -	1x10 ton	1x10 ton	1x10 ton
	1x60 ton	1x60 ton	1x60 ton
			1x40 ton
Total capacity	70 ton	70 ton	110 tons

8.5 Foreign fishing vessel effort in Kiribati EEZ

UNIT-TONS	1976	1977	1978	1979	1980	1981	1982
Japan							
Pole & Line	13 798	14 868	30 433	6 597	18 000		
Long line	4 637	4 493	2 791	5 511	5 850		
	18 435	19 361	33 124	12 108	23 850		
Korea							
Long line	5 293	5 743	5 351	N/A	N/A		
Tawain							
Long line	79	646	300	370			

8.6 Import data

Tinned fish

	Kg	Value A$
1976	116 504	64 688
1977	112 203	70 130
1978	209 370	172 929
1979	299 123	220 397
1980	246 141	180 744
1981	166 513	153 716

FISHERIES DEVELOPMENT IN PENINSULAR MALAYSIA (1970-80)
A COUNTRY STATEMENT

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1. INTRODUCTION

The fisheries sector occupies a small but significant position in the overall economy of the country. In 1980, it was estimated that 110 000[1] fishermen were gainfully employed in the sector accounting for 2.3% of the total active labour force. As a contributor to foreign exchange earnings, the sector's net export earnings in 1980 were M$127 million accounting for 2.2% of the balance of trade. Fish is an important source of protein to the country representing 57% of the total protein supply and is popular among all ethnic groups. The role of the fisheries sector from 1970 to 1980 indicating its relative importance in the Malaysian economy is shown in Table 1.

Table 1

Contribution of the fisheries sector in the Malaysian economy (1970-80)

Key indicators	1970	1975	1980
Fisheries as % of GDP	2.3	3.5	3.4
Fishermen as % of total employment	2.4	2.2	2.3
Annual growth rate of fish production	7.8	6.4	7.6

Source: Annual Fisheries Statistics (1970-80)
Economic Report, Ministry of Finance 1970-80

From Table 1 it is apparent that during the last decade the fisheries sector has not registered any substantial growth in terms of percentage contribution to the country's Gross Domestic Product.

The high incidence of poverty within the fisheries sector is causing serious socio-economic and political problems. An indepth government study to assess the extent of poverty within the fishing community indicated that the incidence of poverty[2] among the fishing community is one of the highest in the country. Nonetheless, through the concerted effort by the public and private sectors there has been remarkable achievement in reducing the incidence of poverty. In 1970, the percentage of fishing households living in poverty was 73.2% while in 1975 it was reduced to 63.0% and, subsequently, in 1980 to 45.3%.

1.1 Fisheries Resources

Data on fisheries resources, especially beyond the inshore waters (12 mi limit), are inadequate to enable systematic and efficient planning and management of resources. Nevertheless, serious efforts are being made to continuously update data on resources and, also, to improve accuracy of data recorded.

Based on landing data collected over the years and the survey estimates of the potential yield of resources in the coastal inshore waters (0-12 mi), it can be concluded that no increase in catch effort can be allowed on the west coast of Peninsular Malaysia. As for the east coast, indication is that limited expansion of fishing fleet may be permissible, but that should be done cautiously in order to prevent repetition of the problem of the west coast.

1/ This figure includes fishermen in East Malaysia

2/ A minimum income level of M$ 300/month for a family of five is used as a guide to classify whether a fisherman or a farmer is living in poverty. In 1970, the poverty-line income was M$ 160/month, in 1975 M$ 210/month and in 1980 M$ 300/month

Table 2

Commercial landing and estimated potential yield

	MSY ('000 m)	1980 ('000 m)	Highest catch level (1973-80)	Balance Available
West coast				
Demersal fish	160	169.4	183.8 (1977)	Overexploited
Shrimp	53	51.1	63 (1978)	Overexploited
Pelagic fish	88	128.5	128.5	Overexploited
East coast				
Demersal fish	81.13	43.5	53.8 (1978)	27.33
Shrimp	5.6	3.6	4.5 (1978)	1.1
Pelagic fish	More than 80	77.4	84	Near full exploitation

Source: Fisheries Research Institute

2. OBJECTIVES OF STUDY

The Malaysian fisheries sector is at the crossroads of development in light of the adoption of the New Fisheries Policy which is contained in the National Agriculture Policy (NAP). The Government has embarked on a radical move to revitalise the fisheries industry and to restructure the sector from one which is dependent on subsidy, to one which is commercially oriented. Modernization of the fisheries sector to increase productivity and efficiency of the fishing communities is given top priority in the formulation of the new policy and strategy. This drastic change in terms of approach, in fact applicable to all sectors, has been necessary because of the heavy financial burden the Government has to shoulder in maintaining the operating expenses of the public sector. This has been aggravated by the long world economic recession which has affected the Government's financial position. For example, recently (1.1.84) the Government removed the subsidy on diesel fuel. Hitherto the Government extended a price support of 10.66 ¢ for every litre of diesel sold in the market. The fishing industry alone received some US$ 51 million of financial support annually to reduce the price of diesel fuel to the industry.

In view of the above policy change, it is timely that this study be undertaken to assess the impact and development of the industry during the last decade. The adoption of the concept of the Exclusive Economic Zone (EEZ) by the Government has also some bearing on the overall development of the sector.

Specifically this paper attempts to assess the impact on the fisheries sector of world economic depression and the energy crisis. This study will be confined to a general evaluation of the structure of the industry more specifically taking a cursory look at the following aspects:

(i) the status of the fishing fleet and the ancillary industries as a result of the diesel fuel crisis;

(ii) the impact of the recession on the welfare and income of the fishermen and their families;

(iii) an assessment of the impact on the biological resources resulting from the modernization of the fishing fleet;

(iv) an assessment of the potential expansion of the industry in view of the additional fishing zones with the adoption of the EEZ concept.

3. FISHERIES POLICY AND INSTITUTIONAL ARRANGEMENT

3.1 Fisheries Policy

The National Agricultural Policy (NAP) was recently announced by the Government, and within the NAP the general policy guideline for the development of the fisheries sector is spelled out as follows:

> "Fish is another important source of protein and the country's fish requirement will be met through the use of modern methods to fully exploit the fishery resources. Offshore fishing will be stepped up through the utilization of both local and foreign expertise and the setting up of adequate fishing fleets.
>
> "Aquaculture will be developed to augment the local supply of fish. In addition, this industry offers great potentials as an export earner. In view of this, the development of the industry will be encouraged."

Basically, the Government policy on fisheries development is comprised of two important elements:

(a) to manage and regulate the exploitation of fisheries resources with the view to realizing the optimum production of fish and fish products to meet the country's food demand; and

(b) to increase the productivity and income of fishermen and fish farmers.

In order to achieve the above goals, the following policy objectives have been prescribed, namely:

(i) to develop and exploit to the maximum the fisheries resources in accordance with sound fisheries management practices;

(ii) to generate employment opportunities in the fishing sector by expanding and modernizing fish production and related industries;

(iii) to raise the economic status and social conditions of fishermen by increasing their output and income;

(iv) to restructure and consolidate the fishing community;

(v) to enable fishermen to actively participate in fishery enterprises; and

(vi) to regulate fish marketing and trading practices in accordance with efficient market practices.

3.2 Strategy for Fisheries Development

Taking cognizance of the policy direction the following strategies have been adopted by the Government agencies responsible for this sector:

3.2.1 Fisheries Development Centre (FDC)

Development effort to stimulate growth to the fisheries sector will not be implemented throughout the fishing villages dotted all along the 1 200 mi of coastline in Peninsular Malaysia. Instead, specific fishing villages will be identified to be developed and designated as Fisheries Development Centres (FDC). The following criteria will be considered in the choice of FDC:

(a) the area selected should have potential for growth from the point of view of fisheries resources and areas for aquaculture development;

(b) there is concentration of fishing community, i.e., fishermen are densely populated;

(c) the availability of infrastructure such as landing complexes or jetties, etc.

Within the FDC concept all Government inputs - be it financial assistance, extension services, infrastructure development - will be channelled through the administrative machinery of the FDC. It is envisaged that more coordinated and efficient utilization of Government inputs can be obtained through this concept. A one-stop agency centre to provide the linkages between the fishermen and the Government will hopefully accelerate the development of the sector.

3.2.2 Private sector contribution

The Government will be relying more on private sector involvement in the development of this sector. Fishing operations will be encouraged to be undertaken on corporate basis. The past practices of "one-boat one-fisherman system" will be confined to the artisanal fishermen. For offshore fisheries the Government is encouraging the issue of fishing licences through corporate ownership.

3.2.3 Self reliance

The fisheries sector in Malaysia has for a long time been overly dependent on Government subsidy for expansion and growth. This has resulted in a dependency syndrome by fishermen leading to reduction in productivity and efficiency. The Government has taken a fresh look at this sector and decided that Government subsidy must be reduced to the minimum. Fishermen who could not enjoy income above the poverty line would be given opportunity to be resettled in other sectors such as Agriculture, Industry and the like.

Fishing activities cannot be undertaken on a part-time basis and the Government's aspiration is to develop professional fishermen who could ensure the sustained growth of the sector into a strong and viable enterprise.

3.2.4 Other

The other strategies which are suggested for implementation include:

(i) management and conservation of the inshore fisheries against overfishing;

(ii) development of offshore fisheries by a combination of foreign and domestic capital and expertise;

(iii) promotion of a larger import of fresh fish and a larger export of semi-processed and fully-processed fish and fish products;

(iv) acceleration of the development of aquaculture.

3.3 Institutional Arrangement

There are two Government agencies directly responsible for the overall development of the fisheries sector, namely Fisheries Development Authority (MAJUIKAN) and Department of Fisheries (DOF), both under the Ministry of Agriculture. The functions and responsibilities of MAJUIKAN include:

(i) promotion and development of the efficient and effective management of fisheries enterprise and marketing of fish;

(ii) promotion, stimulation, facilitation and undertaking of the economic and social development of Fishermen's Associations and Cooperatives;

(iii) promotion, coordination and monitoring of the overall development of the Fisheries Development Centre (FDC); and

(iv) provision and management of fisheries infrastructure.

The DOF is responsible for the following functions:

(i) training of fishermen;

(ii) provision of extension services for the fishing communities;

(iii) research activities; and

(iv) management of fisheries resources through licensing and enforcement.

The provision of credit for the fisheries sector is under the responsibility of the Agricultural Bank of Malaysia.

4. GROWTH OF FISHERIES SECTOR (1970-80)

An attempt to examine the development of the fisheries sector during the last decade (1970-80), will to a certain degree assess the role played by the Fisheries Development Authority of Malaysia (MAJUIKAN) and Department of Fisheries in shaping the status of the sector today. MAJUIKAN was established in late 1971 and being a development agency its programmes have some impact on the industry.

Prior to 1970, the fisheries sector was left entirely to the private sector with the Government only intervening in the management of resources through licensing policy and undertaking some research works. Training and extension activities were carried out on an ad hoc basis. During the 1960s, Government development funds allocated to the fisheries sector were insignificant relative to the agriculture sector. However, beginning in the mid 1970s, Government allocations began to increase as shown in Table 3.

Table 3

Financial allocation for fisheries sector (1971-85)

Year	MAJUIKAN (M$)	DOF (%)	Total (M$)
Second Malaysia Plan (1971-75)	19 936 989	14 437 978	34 374 967
Third Malaysia Plan (1976-90)	79 275 599	85 337 034	164 612 633
Fourth Malaysia Plan (1981-85)	84 865 200	183 430 000	268 295 200

Source: Economic Planning Unit

4.1 Provision of Infrastructure

In the early 1970s, the lack of basic infrastructure, such as landing jetties and cold storage, posed serious constraints to the expansion and modernization of the fishing fleet. Due to the siltation problem at the river mouths, fishing vessels of more than 10 t gross could not be built. In fact, the great majority of fishing vessels today is still within the 10-t gross size. In any case, the scene in the 1980s is a far cry from the early 1970s. On both the east and the west coasts of Peninsular Malaysia, the Government has built centralized landing facilities for the industry. An all-weather fishing port in Chendering, Terengganu, costing some M$ 26 million, was recently commissioned. Three medium-size fishing complexes in Geting, Kelantan, Kuala Besut, Terengganu and Kuala Sedili, Johor, were opened in 1982. Another medium-size fishing complex in Penang will be completed sometime in 1984. All these central landing facilities are equipped with mechanized loading and unloading equipment, adequate cold storage rooms and ample space for auctioning and packaging of fish. A summary of the cost and facilities available in the complexes is given in Table 4.

Table 4

Central fish landing complexes (1983)

Location	Date commissioned	Investment cost (million M$)	Facilities		
			Cold rooms (t)	Jetty (m)	Action hall (m)
Chendering	November 1983	26.0	uc	439	87.8 x 34.1
Kuala Besut	November 1983	8.6	50	96	86.17 x 10
Kuala Sedili	April 1983	6.0	40	90	121.8 x 20
Geting	March 1982	2.44	30	52	36.3 x 10.4
Penang	uc	5.6	uc	100	uc
Kuala Kedah	February 1976	3.0	80	64	36.5 x 21.9

Source: MAJUIKAN

uc = under construction

In addition to the Government facilities, the private sector also built their own landing jetties and cold rooms throughout the major fishing centres. The investment cost may not be high, but the facilities are adequate to render efficient handling of catches and provision of inputs such as diesel and ice.

At the urban centres, the Government built modern inland wholesaling and retailing centres. A recent development in fish retailing is the introduction of the "dry market concept" where fish are sold in prepacked plastic containers and displayed in chilled cabinets. With this concept there is also a change toward transportation of fish in refrigerated trucks. Nevertheless, transportation of fish by the conventional method of wooden iced box, using trucks is still the case for a large majority of fish distributed from the landing points to the consuming centres.

4.2 Fishing Fleet

The expansion of the fishing fleet during the last decade was primarily stimulated through Government incentive schemes and subsidies. Private sector investment has been rather sluggish during the last five years (1977-82) because of uncertainties regarding the issue of new licences. There are two Government-funded programmes to assist fishermen owning fishing vessels and equipment, namely (i) MAJUIKAN hire/purchase boat scheme and (ii) fisheries subsidy scheme operated by Division of Fisheries providing free engines and gear to selected fishermen. The MAJUIKAN boat ownership scheme is mainly confined to vessels of 10, 20 and 40 t gross, both trawlers and purse seiners, and the loan is given interest-free. The fisheries subsidy scheme is largely focussed on the artisanal fishermen by providing boats and gear in the 10-t category and outboard engines for vessels of less than 5 t. The number of fishing vessels, both powered and non-powered, from 1970 to 1980 is given in Table 5.

4.3 Ancillary and Supporting Industries

The rapid development of the fishing fleet has led to the establishment of ancillary and supporting industries such as ice manufacturing, repair and servicing facilities and processing factories. Most major fishing centres are self-supporting in terms of ancillary

Table 5

Number of licensed fishing vessels in Peninsular Malaysia (1970-80)

Year	Non-powered vessel	Powered vessel		Total vessels	% of powered vessels
		Outboard	Inboard		
1970	5 277	2 164	12 865	20 306	74.0
1971	4 821	2 036	14 284	21 141	77.2
1972	4 665	2 009	14 945	21 619	78.4
1973	4 534	1 979	15 298	21 811	79.2
1974	4 072	2 100	16 205	22 377	81.8
1975	3 908	2 138	16 081	22 147	82.3
1976	4 151	2 342	16 142	22 635	81.7
1977	4 329	2 775	16 977	24 081	82.0
1978	6 038	3 684	17 775	27 497	78.0
1979	6 256	5 156	17 741	29 153	78.5
1980	5 502	6 585	18 433	30 520	82.0

Source: Annual Fisheries Statistics, 1970-80

and servicing industries. Investment in ice manufacturing reached a peak in the mid 1970s. During the early 1980s, only a very small number of new ice factories was erected to meet demand for ice by the fisheries sector. Ice factories dating back to the 1950s are still operating, although most of them may not be able to produce to full machine capacity. Table 6 provides a summary of ice factories production capacity and location in Peninsular Malaysia. It also shows the changes in number and production capacity in 1970, 1975 and 1980.

Fish processing in Malaysia is still largely undertaken at cottage-industry levels using traditional methods. There are also modern freezing and canning factories mainly for the processing of prawns and squid. The total production of processed fishery products in Peninsular Malaysia from 1970 to 1980 is summarized in Table 7.

The servicing industry, such as slipway and ship repair, is very slow to respond to the need of the sector. This may be attributed to the practice adopted by fishermen of doing maintenance on their fishing vessels by beaching them on the shore. Vessels with gross tonnage of less than 30 t are generally beached for regular maintenance. Bigger vessels in the category of 70 t and above are slipped in dry dock or repair yards available in bigger fishing centres only. Workshops and engine maintenance depots are well established by the private sector in most fishing centres. Nonetheless these centres do not depend entirely on the fishing vessels but are diversified to cater to other vehicles such as trucks, motorcars and buses. There are of course smaller engine workshops which specialize in maintenance of fishing boats only.

4.4 Exclusive Economic Zone (EEZ)

Malaysia proclaimed the EEZ in April 1980 and in doing so adopted the EEZ concept. The Government proposed legislation in the Parliament to be called EEZ Act 1984 which should serve as an "Umbrella Act" to cover all matters relating to the EEZ. Within the EEZ Act 1984 a new Fisheries Bill 1984 will be presented to Parliament for adoption. Until the EEZ Act is passed by the Parliament, matters relating to fishing activities in the EEZ will be dealt through administrative procedures.

Table 6

Ice factories in Peninsular Malaysia (1980)[a]

Location (State)	Number of factories			Total production capacity/day (t)		
	1970	1975	1980	1970	1975	1980
Perlis	2	2	2	144	113	150
Kedah	4	5	5	135	153	222
Perang	6	6	9	336	340	609
Perak	16	15	11	410	738	1 184
Selangor	12	20	18	232	172	286
Ng. Sembilan	1	1	1	40	40	28
Malacca	2	2	2	65	105	75
Johore	5	6	5	154	285	260
Pahang	5	6	10	64	181	244
Trengganu	3	4	6	48	79	166
Kelantan	2	3	4	82	93	109
Total	58	70	73	1 710	2 399	3 333

Source: Annual Fisheries Statistics (1980)

[a] Excluding small ice machine with production capacity below 1 t/day

Table 7

Total production of processed fishery products (1970-80) (in t)

Item	1970	1972	1974	1978	1980
Dried, salted fish	10 419.46	6 981.16	9 427.03	7 932.73	8 008.31
Dried bilis (anchovies)	7 498.91	5 777.16	3 800.67	6 993.64	9 453.82
Manure fish (used as fertilizer)	12 556.79	18 357.88	23 086.43	33 474.00	11 791.88
Fishmeal	8 436.79	5 339.70	14 133.40	12 182.67	32 950.91
Belacan (shrimp condiment)	1 708.73	4 146.79	1 796.37	2 478.97	2 704.49
Dried prawns	1 322.67	1 810.25	2 430.37	1 510.00	1 270.67
Prawn dust	2 186.13	263.70	109.22	1.70	90.91
Dried cuttlefish	21.82	102.91	8.79	4.25	200.61
Smoked tuna	-	94.73	9.09	26.06	-

Source: Annual Fisheries Statistics (1970-80)

As stated earlier, fishing activities undertaken by fishermen in the country are confined mainly to the inshore areas within 30 mi from the shore. Beyond the inshore areas it was reported that foreign boats had been encroaching on the Malaysian EEZ waters, thus illegally fishing in those areas.

Malaysia, like many other smaller countries, does not have sufficient power to deter illegal fishing activities within the EEZ. Nonetheless, the Government will be implementing a coordinated enforcement scheme which will include deployment of naval forces and marine police together with the enforcement unit of the Department of Fisheries to patrol the EEZ waters.

Recently a new resource management and conservation programme was implemented to safeguard the welfare of artisanal fishermen. This programme was administered through the Minister's Regulatory Power which was authorized through amendment of the Fisheries Act.

The management and conservation programme involves the classification of fishing areas into four zones: Zones A, B, C and D. The zoning was initiated mainly to curtail trawling activities in the inshore areas. Generally, this programme is aimed to achieve the following objectives:

(a) to prevent excessive trawling in the inshore areas and to protect fish breeding grounds and nurseries;

(b) to minimize the destruction of young fish;

(c) to protect traditional fishermen from unfair competition from the industrial or commercial fishing fleet; and

(d) to achieve an equitable allocation of fishery resources.

Zone A is defined to include areas from the shoreline up to 5 n mi and this zone is exclusively allocated to fishermen operating traditional fishing gear and is restricted to owner operators, i.e., fishermen operating their own boats. Zone B lies next to Zone A covering from 5 n mi to 12 n mi offshore. This zone is reserved for fishing boats of less than 40 t gross. Priority is also given to owner operators to fish in this zone. Zone C extends from 12 mi to 30 mi offshore. Fishing operation within this zone is reserved for boats owned by Malaysian interests. Zone D stretches from 30 mi to the limits of the declared Malaysian EEZ and this zone is available to foreign fishing through licensing or joint-venture arrangement.

5. ASSESSMENT OF IMPACT ON FISHERIES SECTOR

During the last decade (1970-80), three major events have influenced the direction of growth within the fisheries sector, namely (i) the introduction of the EEZ concept, (ii) the energy crisis and (iii) the recession affecting the world economy. The fisheries sector in every part of the world to a certain degree has been affected by the three events stated above. In attempting to assess the extent of influence the above factors have had on the fisheries sector, the following aspects will be discussed:

(i) impact on the viability of the fishing fleet and ancillary industry;

(ii) socio-economic conditions of the fishermen and their families; and

(iii) biological conditions, specifically on fishery resources.

5.1 Viability of Fishing Fleet

As shown in Table 5, there was a steady increase in the size of fishing fleet over the period from 1970 to 1980, with a rapid decline in the number of non-motorized vessels. Fishing boats below the size of 10 t appeared to be having the highest growth rate. This does not necessarily imply that the profitability factor encouraged investors to invest in building and fishing vessels. During the last 5 years, the government subsidy programme to provide ownership of boats to fishermen was implemented aggressively with total funds disbursed in the region of M$ 70 million and involving the construction of 2 535 new boats ranging from 10 t to 20 t. Since 1982, government subsidy programme has been withdrawn and it is to be expected that there would inevitably be a drastic reduction in the addition of new vessels. Since there is a paucity of reliable data, it is not possible to evaluate accurately the viability of the fishing fleet. Nevertheless, on a location of specific assessment, the aggregate number of trawlers in Penang has declined drastically from some 280 vessels in early 1970s to some 100 vessels in 1982. Discussion with boat owners in Penang revealed that it is not viable to continue fishing due to high operating expenditure aggravated by reduction of catches. Another area in the east coast of Peninsular Malaysia in Kuala Kemaman also witnessed a near collapse of the trap fishing utilizing boats of 10-20 t gross, though there are still a small number of government subsidy boats continuing trap fishing. Fishermen in this area complain that their traps were destroyed and stolen by foreign vessels.

Purse seiners catching pelagic species like mackerel seem to be surviving quite comfortably. There was a reduction and layoff of purse seiners during the 10-year period due to seasonality of catches. It is generally believed that there may be a five-year cycle of good catches for pelagic species especially in the west coast of Peninsular Malaysia.

Generally, boat owners are complaining that they are marginally surviving. Most of them derive their profits from integrating production with marketing. This is obviously at the expense of the crew's income.

Various studies have shown that the rate of increase in operating costs has been much faster than the increase in gross revenues. Hence trawler fishermen who are supposed to be fishing beyond 5 mi encroach into the inshore waters where the catches are much better.

A recent study undertaken by J. Yahya, covering trawlers operating in the east coast of Peninsular Malaysia, clearly showed that the daily trip expenses for the trawlers have increased to an average of M$ 137/trip for 1979 as compared to M$ 64,5/trip for trawlers in Penang in 1971. The trawlers are in different locations, but they belong to the same size category.

The summary of daily operating expenses for the east coast trawlers is given in Table 8.

Table 8

Daily trip expenses in M$ in selected centres (1979)

Items	Geting	Kuala Besut	Kuala Trengganu	Mersing	Average
Fuel and lubricant	107	104	83	79	93
Ice	24	33	20	14	27
Food, general stores, miscellaneous	9	8	5	46	17
Total	140	145	108	139	137

Source: J. Yahya, Capture Fisheries in Peninsular Malaysia: Lessons from MAJUIKAN Experience

Marine Policy, October 1981

Munro and Chee studied the earnings and operating costs of trawlers in Penang from 1966 to 1977; the result is presented in Table 9.

The cost of diesel which accounts for some 40-50% of the total operating cost of trawlers has increased by more than 278% during the last decade. Table 10 gives the trip expenses of different gear type, and it proves that diesel costs account for nearly 50% of the total operating expenditure.

Table 9

Earnings and operating costs of Penang trawlers on per-boat, per-trip basis (1966-71) (in M$)

Year	Gross value of catch	Operating costs[a/]	Net value of catch	Crew's share	Loss	Owners' share
1966	201.8	84.6	117.2	58.6	0.0	58.6
1967	211.2	91.5	119.8	59.9	0.1	59.8
1968	148.4	73.2	75.4	37.7	0.2	37.5
1969	142.9	71.3	71.7	35.9	0.1	35.8
1970	121.3	69.4	52.4	26.2	0.5	25.7
1971	115.5	64.5	51.0	25.5	0.4	25.1

Source: Munro and Chee, 1979, The Economics of Fishing and the Developing World: A Malaysian Case Study

a/ Includes the commissions levied by the cooperatives

Table 10

Fuel, lubricant, ice and food expenses as percentage of total trip expenses (1982)

Item / Gear Type	Trawl net	Purse seine net	Bottom gillnet	Hand-lines	All gears
Diesel	55.2	39.5	53.2	45.8	45.3
Lubricant	4.3	12.0	4.3	5.1	6.8
Ice	24.5	28.3	25.5	27.1	26.0
Food at sea	16.0	20.2	17.0	22.0	21.9
Total	100.00	100.0	100.0	100.0	100.0

Source: Baseline and Socio-economic Studies Volume II, P.G. Pak Poy and Associates (Malaysia) Sdn. Bhd.

Changes in diesel price during the last 10 years are given in Table 11.

With the expansion of fleet, especially trawlers, there was a parallel establishment of shrimp processing factories. At the peak period of 1975-76, there were more than 30 factories exporting frozen prawn. Today, because of reduction in supply of raw material, more than 50% of the factories were forced to stop operation. In addition to shortage of raw material, quality control was a serious problem. As a result of the closure of processing factories a larger number of factory workers, mainly women, were retrenched.

Closely associated with the development of fishing fleet was the expansion of trading companies dealing in marine diesel engines. Due to the recession and the increase in diesel cost, a number of these companies had to close departments dealing with the sale of diesel engines. There has been a shift from the purchase of new marine engines to reconditioned industrialized engines which are converted for marine purposes. In addition to trading companies, net manufacturers suffered from the recession. There were two net manufacturing companies in Malaysia producing ropes and net materials. In late 1983, one of the net manufacturers, a public company established in 1969, had to close the net

Table 11

Price of diesel/litre (1972-84)

Year	Price of diesel/litre (M$)	% increase (Base 1972)
1972	.16	-
1973	.17	8
1974	.23	50
1975	.27	76
1976	.30	90
1977	.30	90
1978	.30	90
1979	.36	129
1980	.40	155
1981	.46	198
1982	.46	198
1983	.48	209
1984	.59	278

Source: Ministry of Trade and Industry, Malaysia, 1982

factory to diversify to other more profitable business. The company had suffered severe losses in the net department for the last three years. It had employed more than 300 workers in the net factory and had no alternative but to redeploy or retrench them. Fishmeal factories also suffered due to the limited raw material supplies from trawler by-catches. Modern and capital intensive fishmeal factories were compelled to wind up business because of poor financial performance. The traditional backyard fishmeal factories could still manage to continue in operation.

5.2 Fishermen's Income and Welfare

An indepth study of the socio-economic conditions of the fishermen by the Government has shown that the poverty group within the fishermen community has declined from 73.2% in 1970 to 45.3% in 1980. It has been implied that the improvement in marketing system and the modernization of the fishing fleet has contributed to the increases in fishermen's income. Obviously not all the increases in consumer's retail price have gone entirely to the fishermen. It has been confirmed by various studies that the price of fish obtained by fishermen and boat owners has improved tremendously. Apart from better prices there has also been an improvement in the quality of fish because of more liberal usage of ice and improved fish hold insulation. Post harvest losses have been reduced from 20% to some 10% of the total catches especially when fish are landed at the centralized fishing complex. Fishermen are now very concerned regarding the quality of fish because of the premium price paid by the buyers for good and fresh quality fish. Based on the consumer's price index (CPI), the retail price of fish has increased from 100 in 1967 to 249 in 1978 as shown in Table 12.

The rapid mechanization process especially in the trawler fishing has not created a wide disparity in income between the industrial or commercial (e.g., trawlers and purse seiners), and the artisanal fishermen (especially handliners, drift-netters and trap fishing) as has been generally assumed. This can be seen in Table 13 which gives an analysis of income between artisanal and industrial fishermen.

Table 12

Consumer price index
of fish and food
(1967 = 100)

Year	Fish	Total food
1967	100	100
1968	94	97
1969	99	97
1970	110	99
1971	115	101
1972	122	104
1973	142	120
1974	179	152
1975	188	157
1976	211	161
1977	225	169
1978	249	178

Source: Consumer Price Index for Peninsular Malaysia, Department of Statistics

Table 13

Average monthly returns to capital, labour and management
per fishing vessel by selected gear types (1982)
(M$)

Item	Trawl net	Purse seine net	Hand-lines	All gears
Gross receipts to vessels	2 050	11 740	1 920	2 774
Total operating expenses (trip and repairs/maintenance)	530	4 790	800	1 132
Net returns (surplus after operating expenses)	1 520	6 950	1 120	1 642
Share accruing to owners (returns to capital)	760	2 085	336	533
Share accruing to crew (returns to labour and management)	760	4 865	784	1 109
Average crew size	4	19	4	7
Skipper's income	285	384	294	238
Ordinary crew's income	190	256	196	158

Source: Baseline and Socio-Economic Studies, Volume II, P.G. Pak Poy and Associates (Malaysia) Sdn. Bhd.

Despite the remarkable achievement in terms of income to the fisherman and his family there is still a bigger problem of poor quality of life within the fishing communities. Housing conditions, social amenities and basic infrastructure in the fishing villages are still in a deplorable state. Although there have been a limited number of fishing resettlement schemes the large majority of fishermen live in areas which are overcrowded and which lack proper sanitary facilities and electricity. These fishermen may be enjoying a good regular income, but invariably it is not spent in improving their quality of life. This is largely attributed to the fact that the majority of the fishermen do not own land and thus most of the dilapidated houses are built either on rented land or illegally. Due to the above conditions, the educational attainment of fishermen's children and health condition leave much to be desired.

A recent study[1] by a team of researchers confirmed that there is a wide communication gap between the fishermen and the Government extension workers or agents. The community spirit and group action is breaking among some of the fishing communities. Past development programmes have been heavily oriented towards material gain, physical improvement through mechanization without the concommitant development of the fisherman himself and the strengthening of the social fabric in the villages.

Another development which is important to the fishing industry is the out migration of fishermen especially those below 30 years old to other sectors, mainly in the urban areas. This may be a good development because it could reduce the number of underemployed workers in the fishing sector. The problem of finding fishing crews tends to be acute in the border states with Thailand, where however, the availability of Thai fishermen who are more productive and cheaper than Malaysian crew has helped to overcome the labour shortage.

The official statistics of some 90 000 fishermen in Peninsular Malaysia may be overestimated because a recent census taken in the major fishing centres indicates that the number of fishermen is less than the official count. The trend of fishing population according to official statistics is given in Table 14.

Table 14

Number of fishermen in Peninsular Malaysia
(1970-80)

Year	No. of fishermen
1970	68 154
1971	67 961
1972	69 252
1973	68 308
1974	70 805
1975	73 304
1976	73 536
1977	75 645
1978	83 694
1979	82 926
1980	88 972

Source: Annual Fisheries Statistics

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[1] Besut Integrated Fisheries Development Project: Socio-Economic and Base Lines Studies. P.G., Pak Poy and Associates (Malaysia) Sdn.Bhd.

Government effort to organize fishermen through the establishment of Cooperatives and Associations was actively pursued during the last decade. Financial and administrative support was given to Fishermen's Associations to enable them to grow into strong viable entities so that members could benefit from the organization. The performance of most of the Fishermen's Associations and Cooperatives have not been impressive either in terms of financial and business results or from the welfare aspects. As such fishermen generally do not participate actively to strengthen their organizations. The pull factor to join the Association is mainly to secure Government assistance such as subsidy or soft-term loan from a Government-sponsored bank such as the Agricultural Bank. To a certain extent the fishermen have been pampered by the provision of Government subsidy and the loan scheme with no interest. During the last decade the percentage of fishermen who joined the Fishermen's Association increased from 3.20% in 1972 to 40.9% in 1982 as shown in Table 15.

Table 15

Fishermen Association members (1972-82)

No. of F.A.	Tahun	No. of members	Total No. of fishermen	% F.A. members
19	1972	2 214	69 252	3.20
21	1973	6 492	68 308	9.50
26	1974	9 122	70 805	12.88
26	1975	10 508	73 304	14.33
27	1976	11 377	73 536	15.47
34	1977	19 640	75 645	25.96
39	1978	26 028	83 694	31.09
27	1979	27 147	82 926	32.74
18	1980	37 986	88 972	42.69
22	1981	40 339	99 951	40.36
57	1982	40 872	99 951	40.89

Source: MAJUIKAN

5.3 Biological Consideration

From available record it was established that trawling was first introduced in 1963. The result from trawling was so impressive that within one year nearly 900 trawlers were operating in the west coast of Peninsular Malaysia. In 1982 it was estimated that 4 300 trawlers in Peninsular Malaysia were in operation with the bulk of the trawlers exploiting demersal resources within 12 mi from the coastline. Total landings from demersal species in 1980 was estimated at 210 000 t.

Demersal fish landed by fishing vessels, mainly from trawlers has increased from 100 029 t in 1970 to 209 889 t in 1980, representing an increase of 109%. Trawlers' share of the landings accounted for 68.7% in 1970, and by 1980 had increased to 92.4% as shown in Table 16.

The potential yield of demersal fish stock on the west coast of Peninsular Malaysia was estimated at 213 000 t. According to the Annual Fisheries Statistics the peak landing for demersal species was 256 095 t in 1978. Assuming the accuracy of the two figures it appears that the demersal stock off the west coast of Peninsular Malaysia has been overfished biologically. Further evidence of overfishing can be deduced from the composition of total landings which has shown increasing percentage of by-catches from 16% in 1966 to 33% in 1980. The percentage of by-catches in trawl landings is more pronounced averaging

40-50%. A computation of commercial species and by-catches from trawl landings from 1972 to 1980 ranges from 46% to 62%, as shown in Table 17.

Table 16

Annual landings of demersal fish in west coast Peninsular Malaysia (1970-80) (in t)

Year	Demersal fish landings	Trawl catch	% of trawl catches
1970	100 029	68 728	68.7
1971	118 714	94 764	79.8
1972	135 347	94 973	70.2
1973	165 067	125 798	76.2
1974	186 762	152 816	81.8
1975	174 712	147 353	84.3
1976	192 868	175 595	91.0
1977	250 317	226 521	90.5
1978	256 095	235 346	91.9
1979	230 316	210 761	91.5
1980	209 889	193 973	92.4

Source: Annual Fisheries Statistics (1970-80)

Table 17

Composition of trawl landings (1972-80)

Year	Total landings	Commercial fish		By-catches	
		(t)	(%)	(t)	(%)
1972	94 973	45 775	48.0	49 198	52.0
1973	125 798	56 658	45.0	69 140	55.0
1974	152 816	58 208	38.0	94 608	62.0
1975	147 353	60 355	41.0	86 998	59.0
1976	175 595	86 087	49.0	89 508	51.0
1977	226 521	110 005	49.0	116 516	51.0
1978	235 346	127 219	59.0	108 127	46.0
1979	210 761	99 294	47.0	111 487	53.0
1980	193 973	82 361	42.5	111 612	57.5

Source: Annual Fisheries Statistics (1972-80)

The total landings appear to be increasing rapidly from 1970 reaching the peak in 1978 and then declining in 1979 and 1980. Indication from preliminary statistics collected for 1982 also shows a decline in total landings. It is apparent that increase in landings during the last decade was due to increased fishing effort from new vessels entering the industry. Using a simple indicator of number of licensed fishing vessels without adjusting for variability in catch rate between vessels it can be seen that catch per unit effort (cpue) has declined from 107 kg/h in 1970 to 59 kg/h in 1980. In fact, cpue measured in terms of average annual landing per vessel has stagnated at the 50-t level since 1974. This may be a strong indication that the demersal stock within the coastal water (0-12 mi) has been overfished quite severely.

Table 18

Catch per unit effort (cpue) and fishing hours (1966-81)

Year	cpue (kg)	Catch (t)	Fishing hours
1966	447	59 006	132 004
1970	207	72 480	350 145
1974	92	147 999	1 608 685
1978	69	177 771	2 576 391
1980	59	165 580	2 806 441

Source: D. Pathansali, Some observation on Catch and effort of Commercial and Research Trawlers with Estimate of Yield

6. CONCLUSION

The future of the capture fisheries in Malaysia does not look promising if there is no structural change in the sector. There are far too many artisanal fishermen exploiting limited fisheries resources in the coastal waters. Productivity of fishing vessels has declined substantially while operating expenditure continues to increase rather rapidly due to the energy crisis. There has been overcapitalization of fishing vessels and equipment in the industry both through public and private sector investment. In view of the rigidity in the utilization of fishing vessels there is no alternative to the usage of vessels but to continue operating as long as the variable cost could be covered. This results in overexploitation of the fisheries resources.

Despite the policy of limited entry to the sector through licensing, the management of fisheries resources has not been effective resulting in surplus capital investment in the industry. This may be attributed to the inadequacy of data on fisheries resources which could be used for long-range planning. The impracticality of enforcing limited entry through licensing policy is clearly evident in Malaysia. Hence there is an urgent need for reviewing the present resource management system and rethinking the concept of fisheries as a common property resource. Some thought should be given to the concept of property rights for the fisheries resources.

Government subsidy to stimulate the fisheries industry seems to be counterproductive. The target group (i.e., the fishermen) who were supposed to be elevated from the poverty group with the implementation of the subsidy scheme may not have reaped the maximum benefit from the scheme. Even though the productivity and efficiency of the fishermen appears to be somewhat improved by the modernization of fishing vessels with a resultant increase in income, this short-term gain cannot be sustained. It is quite possible that if financial support is not forthcoming a large number of the fishing fleet may be forced to stop operation. This may be good to the fisheries resources, but it would create serious socio-economic and political problems.

Given the present fisheries resource position in the coastal waters it is conclusive that the 90 000 fishermen cannot continue to remain in the sector. A large number of the fishing population, somewhere around 20 000 fishermen, will have to be redeployed to other sectors such as Aquaculture, Industry and Agriculture. If this restructuring can be accomplished, then it is possible that those fishermen remaining in the sector can enjoy an income above the poverty-line. Productivity of fishermen must be increased through continuous process of upgrading in skill and knowledge of modern fishing equipment, fishing technique and proper post-harvest handling of catches. More concerted effort must be mobilized by government agencies to focus on the social structure and system of the fishing community and to give adequate attention to the human aspect in the development process. Appropriate and effective extension services must be given priority in the modernization process. Quite often the felt need of the fishing community has not been recognized; expensive and prestigious fishing complexes were built when the simple practical landing jetties would suffice.

The problem of overexploitation of fisheries resources must be rectified immediately. Positive action to conserve resources and a restocking process must be implemented continuously. Artificial reefs should be constructed wherever appropriate and this must be done by fishermen themselves. The appropriate step is to educate fishermen on the importance of resource conservation and to gradually delegate the responsibility to manage resources to fishermen through their Cooperatives or Associations.

In view of the energy crisis it is prudent to have a closer look at the fishing technique of trawling which uses more energy than other fishing methods. In addition, from the point of view of conservation, indiscriminate trawling activity may be destructive to fisheries stock. Such efficient gear has also created conflict between fishermen. Therefore, within the inshore waters it may be appropriate to discourage trawling while other fishing techniques should be given incentive and support.

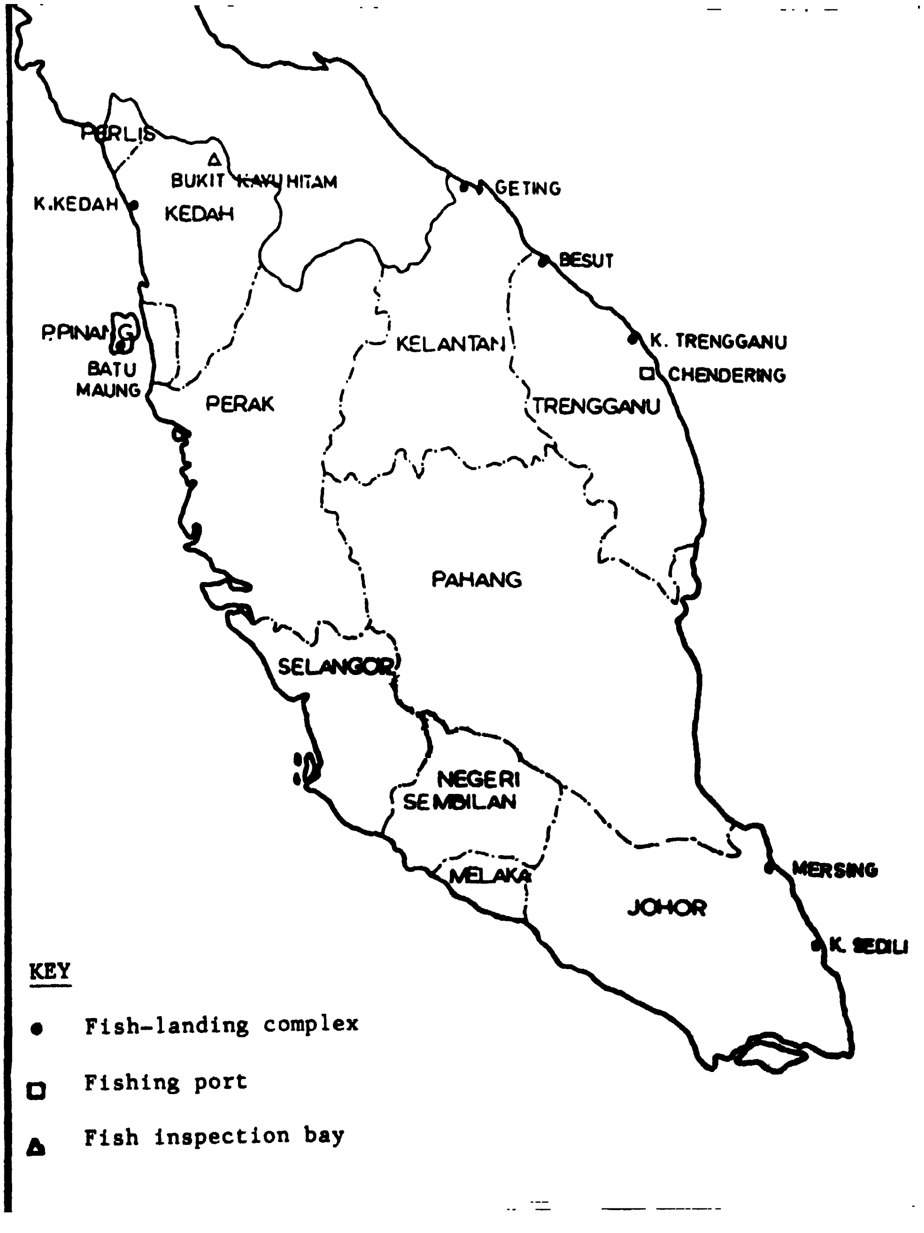
The adoption of the EEZ concept has enlarged the fishing grounds for Malaysia. In the near future it is quite unlikely that the present fishermen or even entrepreneurs could expand their operation beyond the coastal waters. The benefit that could be expected from the EEZ concept is through joint venture with foreign fishing companies which have the vessels and experience to undertake this venture. Preliminary resource survey information in the offshore areas does not present a bright prospect because of the sparsely populated fisheries resources in the EEZ, especially with respect to demersal resources. Pelagic species like small tuna appear to be more promising for foreign joint venture projects in Malaysia. The benefits to the country would be more in terms of employment if processing factories are established in the country and of foreign exchange earnings from export of processed products. The potential expansion in deep-sea fishing cannot solve the overcrowding and overexploitation of fisheries resource in the coastal waters. Hence the reduction in fishing population will have to be planned through redeployment of fishermen to other sectors especially Aquaculture and Industries. Malaysia is fortunate because of its small population relative to other Southeast Asian countries like Indonesia, Thailand and Philippines.

The new strategy to concentrate development in specific areas designated as Fisheries Development Centres will be much more effective and will accelerate the overall progress and growth of the sector. Emphasis on the improvement in the quality of life of the fishing communities will lead to an improved standard of living in the villages. The community spirit among the fishermen must be fostered through the revitalization of the Fishermen's Associations. Leadership and entrepreneural training for elected members of Associations will have to be given priority to improve their management capabilities.

Participation by fishermen members to promote their own group action must be encouraged. In short, development efforts for the sector must be preceded by the overall development of the target group themselves, i.e., the fisherman and his family. There is an urgent need to solve the human problem first in order to ensure a sustained growth of the fisheries sector. The public sector will play the role of a facilitator and promoter only while the prime movers in the sector will have to be the fishermen themselves, their associations and the private sector. The overdependence of fishermen on government assistance will have to be reduced gradually. In the interim, more financial and manpower support should be directed towards research and development works and strengthening the Fishermen's Association.

The capture fisheries sector in Malaysia needs to be consolidated and restructured. Future expansion of the fishing fleet must be done cautiously and evaluated under strict commercial criteria. The potential expansion in the fisheries sector lies in the promotion of the aquaculture activities. It is envisaged that a fair proportion of underemployed fishermen could be absorbed into aquaculture enterprises to change from being fishermen to fish farmers. Programmes for the intensification of aquaculture will be undertaken by both the private and public sectors, and this is given top priority by the Government.

MAP SHOWING LOCATION OF FISHERIES COMPLEXES
IN PENINSULAR M'SIA



THE MARINE FISHERIES SECTOR IN MOROCCO

by

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1. BACKGROUND

Morocco, whose geographic location and long coasts on the Mediterranean and Atlantic favour maritime activities, has always had exceptional fishery assets. The economic potential which derives from this situation has led the Government to include three instruments in the 1981-85 Five-Year Plan:

- a planning instrument -- designating fisheries a national priority;
- a legislative instrument -- declaring a 200-mile exclusive economic zone along the coasts resulting in a maritime area of one million square kilometres; and
- an institutional and governmental instrument -- establishing the Ministry of Marine Fisheries and Merchant Marine charged with implementing the other two instruments.

The strategy for the promotion and development of marine fisheries involves:

- improving the production and utilization of products of the sea, thereby increasing fish consumption to improve the nutritional level of the population;
- creating jobs at all stages of production, processing and marketing, and
- increasing the sector's contribution to the balance of trade.

2. RESOURCES

In recent years, fishery resources have become an economic factor which coastal States have sought to appropriate by establishing reserved fishing zones of 12 nautical miles, then of 70 nautical miles, and finally of 200 nautical miles. The new law of the sea involving worldwide acceptance of the concept of the 200-mile EEZ, has transferred control over fishery resources to the coastal States and resulted in a veritable division of the oceans.

As stated above, Morocco is among the countries privileged by geography. With a coast extending over 3 500 kilometers on the Mediterranean and Atlantic and a wide continental shelf particularly rich in fish, Morocco has major resources which place it among the foremost fish producers in Africa. Its present production gives it second place after Nigeria, and it is the world's primary producer of European sardine (Sardina pilchardus).

According to the latest estimates, sustainable catches could be about 1.3 million tons a year for a total value of US$ 650 million. More than 70 per cent of this potential is composed of pelagic fish, mainly sardines, with a commerical value representing a little more than 20 per cent of total value. Slightly less than 30 per cent of the resource consists of premium commercial fish (cephalopods and white fish) valued at US$ 515 million, or almost 80 per cent of the total value.

3. PRESENT SITUATION OF THE MARINE FISHERIES SECTOR

Until 1973, Moroccan fisheries were limited to so-called coastal fisheries which may be defined as production of fish in the fresh state, taken mainly by wooden vessels rarely in excess of 150 gross tons and landed in Moroccan ports. Such operations involve a system of income sharing between the fishermen and the ship owner. It is called quota system.

Following promulgation of a maritime investment code in 1973, we have witnessed the beginning and then the spectacular development of a new type of fisheries -- deepsea fisheries.

3.1 Coastal Fisheries

Coastal fisheries are, however, by far the more important activity in Morocco. They directly employ more than 30 000 fishermen and catch an average of 300 000 tons a year, 15 to 20 per cent of which is benthic fish, the rest consisting of pelagic fish.

3.1.1 Small-Scale

These fisheries use several types of vessels:

- Small craft for seasonal activities total about 6 100 units of less than one gross ton and less than 30 horsepower. This is a subsistence activity but it is important for supplying the coastal population;
- long-line/trap and langouste fisheries involve 803 units for a total of 3 115 gross tons and 37 000 horsepower. The trend is toward greater size and engine power (4-5 gross tons and 33-85 hp).

Annual production ranges from 5 to 30 tons for units making one-day trips to 200 tons for longliner/trawlers making 8 to 10-day trips.

3.1.2 Coastal Trawlers

These are wooden units 10 to 28 metres long, displacing 16 to 130 tons and ranging from 90 to 450 horsepower. They are divided into trawlers proper (211 units) and sardine trawler/seiners (134 units). Trips last one to three days in the case of trawlers working in the traditional fishing areas and two to 6 days for the biggest units which sail as far as Tarfaya in southern Morocco.

3.1.3 Sardine Boats

Sardine vessels, 408 units totalling 17 864 gross tons and 110 000 horsepower, represent the biggest aggregate of engine power and are the principal element of what is called industrial fisheries because their catches are bound for processing plants.

These vessels have an overall length of 13 to 28 metres; their gross tonnage ranges from 14 to 150 and their horsepower from 90 to 480.

The majority of these vessels make 150 to 230 trips of a few hours each. They are of wood, seaworthy, and can handle a large quantity of fish; but they are slow, consume much energy and have a poor propulsion yield. In addition, the design and use of their holds, especially in vessels operating in the Atlantic, are major drawbacks as they lack insulation and cold storage capacity.

Although sardine fishing is the major activity in the Atlantic, it is the prototype of a fragile operation because it is subject to the uncertainty of fish concentrations and to the constraint of a single specific outlet.

3.2 Deep-sea Fisheries

This is the sector that has witnessed the most spectacular development in the past few years. The fleet consists of 167 units with gross tonnage totalling 57 558.56. The vessels are mainly freezer-trawlers. They are 37 to 40 metres long overall, displace 200 to 500 tons and are equipped with 1 000 to 2 000 horsepower. Fishing trips range from 35 to 65 days.

Deep-sea operations are based in Las Palmas, Canary Islands, because of various deficiencies in Moroccan ports, more specifically:-

- lack of adequate infrastructure for receiving and storing frozen products
- non-availability of repair and maintenance facilities for meeting the major needs of this fleet
- lack of a commercial site that could accommodate transport craft, store products, attract businessmen, etc.

Another problem arises from the fact that operating these sophisticated vessels calls for skilled manpower that is in short supply in Morocco. Therefore foreigners have to be employed. This manpower is expensive and has to be paid in foreign exchange.

In addition to the freezer-trawlers, Morocco has five tuna vessels which operate outside the Moroccan EEZ and land their catches abroad. This fleet also relies on foreign manpower and depends on foreign bases for all operations.

Altogether Moroccan deep-sea production over the past two years averaged 50 000 tons valued at about 450 million dirhams.

3.3 Contribution by the Fisheries Sector to the National Economy

Coastal and deep-sea fisheries produced 393 400 tons in 1981 valued at DH 766 million and 357 000 tons in 1982 valued at DH 924 million, that is volume declined by 9.3 per cent whereas value rose by 20.6 per cent. Of the 357 000 tons in 1982, coastal fisheries produced 293 000 valued at DH 414 million and deep-sea fisheries took 64 000 worth DH 510 million-

The fisheries sector contributed 0.3 per cent to gross national product and accounted for 1.5 per cent of value added for the agricultural sector.

Its contribution to exports, especially since 1981, has been significant. In 1980, the total value of fishery exports was 486 million DH; it amounted to DH 1 014 million in 1981 and to DH 980 million in 1982.

Exports consist of fresh, smoked, salted and dried fish, crustaceans and molluscs, canned fish, fishmeal, fish oil, and algae. In this connection, it should be pointed out that Morocco produces about 4 000 tons of sea algae a year, as well as 120 tons of oysters at Oualidia near El Jadida.

3.4 Utilization of Fish

Fish landed in Morocco is used in various ways. Twenty six percent of all catches landed in Moroccan ports is consumed as fresh fish. This represents a per caput consumption of 4 to 5 kg which is low in view of the protein requirements of the Moroccan population. However, in actual fact, the consumption level is higher since a considerable quantity is landed by small boats on the beaches and does not pass through the fish markets and thus is not recorded. Also, there are major regional differences in consumption: more fish is eaten in the coastal areas than in the interior of the country; and consumption is higher in the north than in the south. In general, while the consumption of fresh fish is tending to increase, 60 per cent of consumption consists of sardines, saurel, anchovy and mackerel, that is, very inexpensive fish.

The canning industry, about 70 plants, absorbs about 30 per cent of catches and uses mainly sardine and mackerel. One-fifth of output from these plants is sold in Morocco.

About 20 factories for by-products regularly buy some 40 per cent of catches. Sardine accounts for 90 per cent of the quantities delivered to these factories for manufacturing fishmeal and fish oil. It should be noted that by-products have been the main outlet for coastal fish catches.

Considering that the price of one kilogram of fish delivered to the canneries is one dirham whereas the price of fish sold to fishmeal plants is 24 centimes, it is justified to be concerned about such depreciation of this protein-rich product.

Lastly, about 4 per cent of catches is used for freezing -- a step forward, but not yet enough -- and for salting (mainly anchovy).

This broad outline shows that 70 per cent of the catches taken by the Moroccan coastal fishing fleet goes to the canneries and by-products factories. The coastal fishery sector is handicapped by its vessels, the design of which should be revamped to provide better fish preservation on board.

For deep-sea fisheries, everything has yet to be done because its activities have to rely on external bases owing to a lack of appropriate infrastructure in Morocco.

4. PROSPECTS

The creation of a Ministry of Marine Fisheries and Merchant Marine shows Morocco's determination to give new impetus to the renewal of this important sector. To this end, marine fisheries have been designated a national priority under the 1981-85 Five-Year Plan.

To reiterate, the sector should become:-

- an economic and social development pole because it can create jobs, produce secondary effects beyond its own sphere and open up disadvantaged areas near the coast
- a strategic reservoir of food resources capable of permanently contributing to the population's nutrition
- a major source of foreign exchange contributing tangibly to improving the balance of payments

4.1 State Action Programme

4.1.1 Resource Management

By establishing a 200-mile exclusive economic zone in 1981, Morocco assumed responsibility for resources that it intends to conserve. While Morocco has been privileged by geography, it has, like many other developing countries, been ill-treated by history since it has inherited fishery resources that had been reduced by fishing efforts in the past. Thus the country immediately faced management problems.

Establishment of a rational stock management policy therefore is, and will be, one of the principal lines of action for the Ministry of Fisheries. Such a policy can not be pursued without information on resources, their evolution, distribution and location. Therefore, continuous evaluation of fishery stocks through scientific research programmes is one of the main assignments for the I.S.P.M. The Ministry of Marine Fisheries and Merchant Marine intends to give the institute a new dimension in line with the priority accorded to the marine sector.

4.1.2 Training

In view of the primary role of the human element in all development, the Government is paying special attention to training. Training should be the cornerstone of the sector's growth and should integrate all categories of personnel -- researchers, technicians and skilled workers -- to meet the needs of fisheries in general. Two thousand qualified people are to be trained under the 1981-85 Five-Year Plan. The target is to have all fishing vessels manned by Moroccans by 1990.

4.1.3 Port Infrastructures

Traditionally fishery activities developed using existing commercial ports. When fitted into these ports, activities were placed in the part of a port that was least usable by existing shipping traffic. Under such circumstances the services offered had to be unsatisfactory. In addition, these existing facilities have been overwhelmed by the development of the fishing fleet. In general, harbour basins are inadequate and saturated, there is not enough mooring space, and there are no suitable facilities for hauling out vessels.

But it should be noted that the Ministry of Supply has developed a master plan for the ports of the Kingdom. A new major port has been built at Tan Tan. This is to be expanded, as is the port of Agadir, so that the operations of the deep-sea fleet can be transferred to Morocco. This transfer, to which the Ministry of Fisheries attaches great importance, should enable the country to benefit from the economic, financial and social effects of the deep-sea fisheries activities.

4.1.4 Production Resources

The average age of the vessels of the coastal fleet is 15 years, and some are up to 50 years old. Moreover, coastal fishing vessels have no fish detection equipment, lack appropriate storage facilities and have a limited range. The Government's action is aimed at renewing the fleet gradually and at modernizing vessels under the age limit.

It should be noted in this respect that the O.N.P. plays a leading role as a public agent in pilot operations (e.g., establishment of semi-public companies for fisheries) and in stimulating the artisanal fleet to use ice, to preserve fish, to motorize small boats and to adopt fish-detection devices.

4.1.5 Promotion of Related Activities

Although the coastal fisheries fleet is based in Morocco, an increasing number of fishing vessels are being repaired abroad because of the inadequacy of repair yards in the country. In addition, the domestic facilities cannot cope with the needs of deep-sea fishing vessels. There is therefore an increasing awareness of the need to develop workshops and construction and repair yards; apart from saving foreign exchange, this is expected to create jobs and produce secondary effects on industry.

Cold-storage installations are also inadequate. There is a considerable need for better utilization of catches by coastal fisheries (up to some 60 per cent of which is sometimes bound for fishmeal factories) and for a cold-storage infrastructure to handle frozen-fish cargoes of deep-sea fisheries. In other words, the whole cold chain (ice manufacture, refrigerated warehouses, freezing and storage at minus-temperatures, refrigerator lorries) has yet to be built up -- or perfected because a start has already been made. The fact remains, however, that at this time, cold-storage capacity at plus-temperatures barely meets ten per cent of requirements and that capacities for freezing and storage meet some 40 and 25 per cent of those needs respectively. In view of the importance of cold storage in marketing such a perishable food in the country and in promoting exports, this gap should be rapidly filled.

4.1.6 Aquaculture

Aquaculture would seem to be a promising activity for the future. To be sure, it calls for advanced technology, but Morocco, with highly suitable natural sites cannot ignore this sector for the future. A basis should be laid now to prepare for access to this type of fisheries. Nador Lagoon, covering about 115 hectares, has shown great possibilities for aquaculture. A recent FAO publication says that the lagoon might produce 20 000 tons a year.

4.2 Way and Means

As far as ways and means are concerned, the following points should be listed:

- The maritime code governing all maritime activities -- fisheries and the merchant marine -- is being revised to gear it to the new conditions and circumstances imposed by technology and evolution of the law of the sea.

- New regulations have been issued governing the fish trade. They are aimed at better organization (distribution systems, price controls) and more hygenic conditions of fish preservation:

- Insurance regulations are being revised.

- Maritime credit is being revised in the light of short, medium and long-term needs. A specific institution for maritime credit is to be established soon.

- Fishermen will be covered by a statute providing for a social security agency and family allowances. Social security is an important consideration for the new Ministry which wants to establish a clearcut and sound benefit system for fishermen.

- A programme for setting up cooperatives (grouped in fishing villages) along the coast has been designed to open up disadvantaged areas near the coast and to help keep rural people in their home villages. This is a priority for the Ministry.

- Lastly, a new law providing for investment incentives is about to be issued Compared with the 1973 code, this new maritime investment code covers a wider field by offering advantages to new beneficiaries. Cooperatives, aquaculture enterprises, tuna trap operators and enterprises operating fishing vessels are eligible under the new law.

Major integrated fishery projects may also obtain additional government benefits under special conventions. The code also covers new investments by existing enterprises.

Benefits include 15 per cent subsidy for the purchase of fishing vessels built in Morocco. The subsidy is 7.5 per cent for vessels imported and less than five years old. The investor may choose between ten-year tax exemption on profits and this incentive payment.

In addition, there is a 20 per cent subsidy based on the value of equipment for the establishment of construction and repair yards if they are also eligible under the industrial investment code. In this way, according to the provisions of the new law, construction yards are entitled directly to a 20 per cent equipment incentive and indirectly to a 15 per cent incentive granted for acquiring units built in the country, as well as to a five per cent bonus if the new vessel replaces an old one that has been demolished.

Coastal fisheries also greatly benefit from this new law.

Three incentives are contemplated:

- 15 per cent for construction of new vessels;
- 15 per cent for modernization of vessels calculated on the value of equipment and installations introduced to improve fish yield or quality; and
- an additional 5 per cent for new vessels which replace old ones that have been demolished.

In conculsion, prospects for development of the sector do exist; increased aid to coastal fisheries indicates this and is a profound change in philosophy which should be underlined.

THE ECONOMIC SITUATION IN THE NORWEGIAN FISHERIES
1983

by

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1. SUMMARY

Norway is one of the large fish producers in the world. Nevertheless, in the context of the national economy the importance of the fishing industry is minor. Regionally, however, the fishing industry still is of vital importance.

The fishing industry in Norway has - over the past decades - experienced a satisfactory average income per man year, compared to the average in the industrial sector. The relatively high income level for the fishermen is, however, partly attained through state income support. This support has over the past 5 years contributed about 50 percent of net income in the fishing industry. When state support is deducted, however, profitability ("real profitability"), has declined over the past 10 years.

This article examines the reasons for this development. External factors, such as over-exploitation of the stocks prior to the establishment of 200 mile zones in 1977, the international economic recession and, in the case of Norway, deteriorating economic competitiveness because of rapid increase in wage and cost level, seem to be important explanatory factors.

Our internal fisheries policy has, however, also been decisive for the negative trend in real profitability. One important policy element is that of state income support, which year after year has stimulated participation in fishing and investment in the fishery sector, even when real profitability has been at a minimum and when capacity has far exceeded present and future catch possibilities.

The maintenance of excess capacity through state subsidies not only contributes to a low real profitability; it also complicates the implementation of the necessary preservation efforts.

Another policy element which has hampered development in real profitability seems to be the standards by which quotas are allocated between vessels and vessel groups. These standards have so far given priority to small and medium sized vessels. In the long run, the way quotas are allocated has a significant influence on the structure of the fishing fleet.

These policy elements must be understood against the background of conflicting objectives. The fisheries policy is an important part of the Government's policy for the maintenance of regional settlement. But it must also seek to promote an economically efficient fishing industry, taking into consideration the need for a reasonably equitable distribution of income.

This article outlines some instruments which have been used to restore real profitability. Scrapping programmes to get rid of excess capacity in the fishing fleet and the processing industry probably are the most important ones.

In addition, analyses show that some sectors of the fishing industry can compete successfully with other sectors of the economy even without state subsidies.

Overall, fisheries policy in Norway seeks, however, to embody considerations of profitability as well as more general socio-economic goals. Recent development has seen an increased focus on the need to improve real profitability. But wider social considerations are still of importance when formulating an overall fisheries policy.

2. INTRODUCTORY REMARKS ABOUT THE NORWEGIAN FISHERIES

Norway is one of the large fish producers in the world. In 1983, total catch amounted to 3 million tons.

About 30 000 fishermen and 20 000 fishing vessels are engaged in fishing in Norway. A large number of the fishing boats are relatively small, and participate only on a seasonal basis. These vessels do not contribute significantly to the total catch which mainly is landed by some 250 relatively large (100-200 feet) and extremely efficient purse seiners, 80 stern trawlers (120-200 feet) and about 1 500 medium size fishing vessels (40-120 feet) operating on a full year basis.

The catch is delivered to a large number (ca. 500) of relatively small processing plants, scattered along the long coast in numerous fishing villages. The processing industry employs workers corresponding to about 15 000 man years.

The major part of the fisheries is located in the northern part of the country, which is sparsely populated and often with less economic activity than average.

Norway has a population of only four million people. The domestic consumption therefore is limited and accounts for only ten percent of the catch. Consequently the Norwegian fishing industry is heavily dependent on the international market.

The income of the full-time employed fisherman is roughly the same as the average wage of the Norwegian industrial worker. However, the fisherman's income level is partly attained through state subsidies.

The food processing industry in Norway, however, offers considerably lower wages. The fish processing industry is no exception and hence the work force in this sector is a low-earning group compared to Norwegian average.

Measured in terms of national economy the importance of the fishing industry in Norway is at present minor. It employs only about two percent of the labour force and contributes about one percent to the net national income. However, located along the coast, the fishing industry still plays an important role in maintaining regional employment and economic activity, particularly if we include the many activities which derive from fishing.

3. POLITICAL OBJECTIVES AND INSTRUMENTS

In a recent report (June 1983) from the Government to the Parliament (Storting) on a fisheries policy for the future, four main objectives are set out:

1) improve the "real profitability" (i.e. the profitability after deduction of state subsidies to the fishery);

2) preserve the pattern of settlement in the coastal areas;

3) rebuild the fish stocks;

4) supply people with secure and good workplaces.

It is interesting to observe that compared to a similar Parliamentary report some years ago (August 1977), objective no. 1 is a new one. The emergence of this objective must be understood against the background of declining real profitability, resulting in increased need for state income support to the fisheries.

To a certain degree the four objectives are inconsistent. The maintenance of the settlement in the sparsely populated regions through the fishery policy can only be achieved at the expense of real profitability.

Further, rebuilding of the fish stocks implies - in the short and medium term - a decline in gross income without a corresponding decline in total cost. This is not compatible with objective no 1.

The Parliamentary report acknowledges these contradictions and concludes that "the political task will be to search for options that create balanced solutions. Both the need for economic efficiency on the one hand and more "common social" needs on the other hand must be taken into consideration. By this weighting one must ensure that real profitability in the fisheries sector at least keeps pace with the development in the rest of the economy."

The Ministry of Fisheries has at its disposal a variety of political instruments in order to achieve the objectives:

- negotiations with neighbouring countries on total quotas and other restrictions on fishing;
- national regulations on the capture of certain species;
- limited entry to specific fisheries;
- gear restrictions (both for biological reasons and for reasons of regulating competition between different groups of vessels and gear);
- economic support;
- vessel and plant scrapping programmes/re-structuring programmes;
- promotion of research and development projects for the fisheries;
- welfare programmes especially designed for the fisheries;
- construction of harbours;
- export regulations (restricted access to the business of exporting fish);
- financing/refinancing of vessels and plants (capital allocation).

The Government thus can - if it wants to - exert great influence on the fisheries and its development. The trend over the last years is, however, that the Government is less inclined to interfere in details and more inclined to let the fishing industry itself determine pace and direction. Still, different actions by the Government have an immense effect on the Norwegian fishing industry.

4. OBSERVED AND REAL PROFITABILITY. DEVELOPMENT IN THE PERIOD 1974-82

During the 1970's average recorded (observed) income per man-year in fishing increased at the same growth rate as did the wages in the society as a whole.

This is far from surprising, since the fishing industry has annually over the last 20 years received state income support, measured and designed with the aim of bringing fishermen's income up to the average of the industrial worker.

If we look at the development in terms of real net income, i.e. observed income with state income support deducted, we will see quite another picture. State income support has over the past 4-5 years made up about 50 percent of the net income for the fishing industry as a whole. Deflated to take account of the consumer price index, the real net income for the fishing industry has shown significant reduction in the time period 1974 - 82.

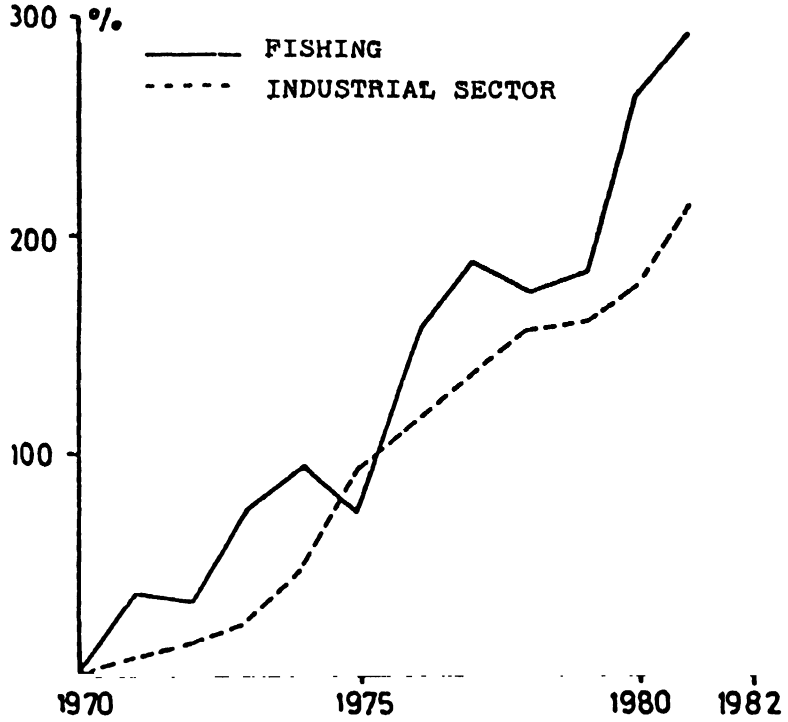
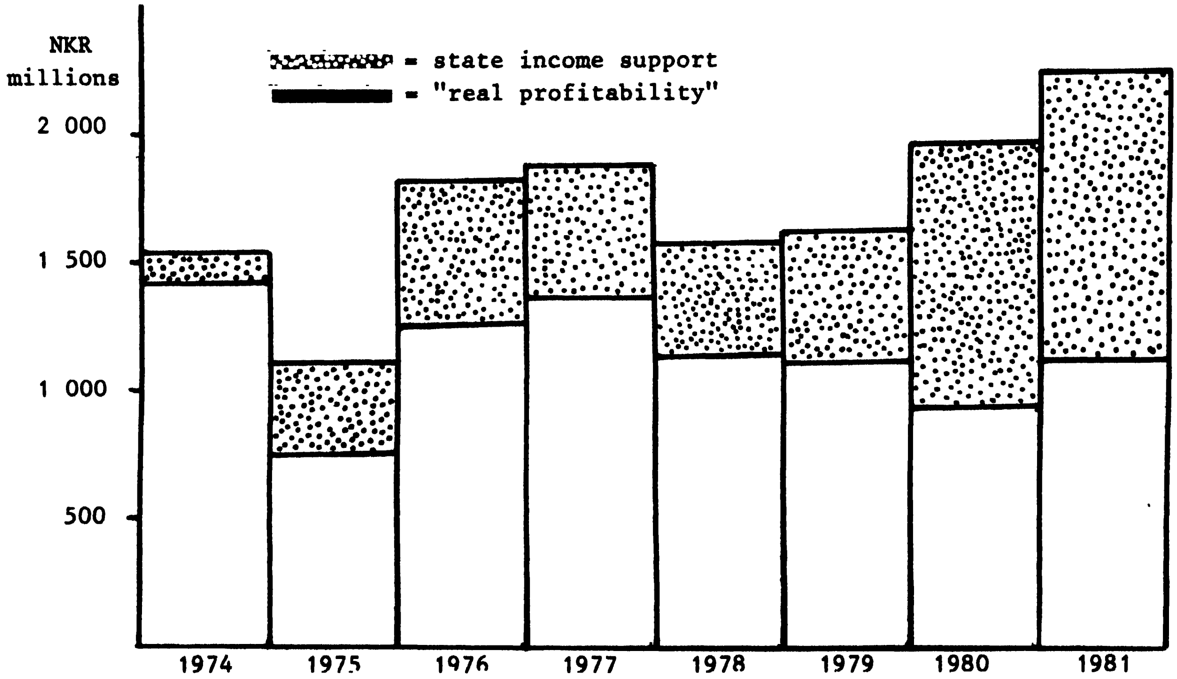


Figure 1: Increase (in percentages) in wages in the industrial sector and net income per man-year in fishing



Source: Parliamentary report No. 93 (1982-83) on Guidelines for a fisheries policy

Figure 2: Net income in fishing and fish processing

The next chapter throws some light on the main reasons for the development shown in Figure 2.

Figures 1 and 2 refer to average. If we take a closer look at the development in the various vessels groups, we will see considerable differences with respect to change in real and observed income. Generally speaking, large vessels, except for stern trawlers have had a higher wage earning ability per man-year than the smaller ones. Measured after deduction of state income support, the large, capital-intensive vessels have- generally speaking - had the lowest income per man-year. This feature will also be explained in the later chapters.

5. EXPLANATORY FACTORS. A SUMMARY

The decline in real profitability (i.e. recorded income minus state income support) can be explained by several factors. Over-exploitation of important fish stocks has meant lower density of fish in the sea and hence increased average cost per ton caught. The efforts made to rebuild the stocks have meant reduced quotas and hence over-capacity both in terms of vessels and processing plants. However, even in such fisheries where the stocks are still in a relatively healthy state, real profitability has declined, due to a general deterioration in the international competitiveness of the Norwegian economy over the last 7 - 8 years. As mentioned earlier, the Norwegian fisheries are heavily dependent on the international markets for fish products.

The high average income level in the fisheries attained through the income subsidies has also contributed to this development. Year after year investments and participation in the fishery have been stimulated through income subsidies. The self-adjustment, which otherwise one should experience in a sector with falling and negative profitability, has thus not taken place.

The different explanatory factors will be described in more detail in the next chapters.

6. THE NEW REGIME OF THE SEA. EFFECTS ON REAL PROFITABILITY

Norway, together with its neighbouring countries, the Soviet Union and the EEC, declared a 200 mile economic zone on 1 January 1977. As a consequence, the former multilateral negotiations on fish stock preservation in the North East Atlantic were replaced by bi-lateral negotiations between the coastal states for the Barents Sea, between Norway and the Soviet Union; for the North Sea area, between the EEC and Norway. Norway also shares some fish stocks with the Faroe Islands, Iceland and Sweden.

Seven years after the establishment of the economic zones, one may conclude in the case of Norway that the new form of cooperation has brought mutually beneficial fisheries relations with other affected coastal states, though there of course has been and surely still will be some items subject to disagreement.

Almost all fish stocks of economic importance in the Norwegian waters were subject to over-exploitation prior to the establishment of the economic zones in 1977. Normally the rebuilding of a depleted stock has to be carried out over a considerable time span. Therefore it is yet too early to assess the advantages of the new system of stock conservation. But we may assume that without the extension of the national fisheries jurisdiction, the stock deterioration would have been further aggravated. In this respect the New Regime of the Law of the Sea has had a positive impact on profitability.

7. PRESERVATION EFFORTS. NATIONAL REGULATIONS

In order to rebuild the cod and the capelin stocks in the Barents Sea and the mackerel and herring stocks in the North Sea, international regulations have been agreed upon by the coastal states. As a consequence, Norwegian fishermen have over the last 5 - 10 years been subject to several limitations in their fishing activities.

Every year since 1974, individual vessel quotas of capelin have been fixed for the Norwegian purse seiner fleet. Vessel quotas have depended upon the total Norwegian capelin quota, the participation in the fishery and the size (capacity) of the vessel (the maximum allowable capacity of each purse seiner is stated in the licence papers). So far the authorities, through a set of rules which allocates the total quota among the vessels, have given priority to the small and medium sized vessels. Though the large vessels have been allocated the largest quotas, they nevertheless have had the shortest catch-season, due to their superior efficiency.

Through this allocations policy, the authorities have influenced the structure of this fleet and restrained a development towards a more profitable purse seiner fleet as the emergence of efficient large units has been impeded.

The previously mentioned low - or indeed negative real profitability for the large purse seiners is partly a consequence of the method of fixing vessel quotas.

Over the past years, the Ministry of Fisheries has made an effort to change the allocation-key to the benefit of the most efficient units, in order to increase average real profitability and reduce the need for state income support.

A similar development has taken place in the cod fisheries. The stern trawlers have for several years been subject to strict regulations, whereas the fleet of medium and small coastal vessels was under no restrictions with respect to the catch volume for this species.

Over the past three years, however, catch restrictions have also been applied to the coastal fleet through "extended week-ends fishing ban" and through fish ban periods in connection with the Easter, Summer and Christmas holidays.

The previously mentioned low real profitability for the large trawlers is also partly a consequence of the strict catch regulations. In general, large and capital intensive units are more vulnerable to regulations in fishing than smaller ones, which have lower fixed costs.

However, taking into consideration the prevailing low density of fish in the Barents Sea and the high Norwegian cost level, the stern trawlers would probably not have managed to attain a real profit (i.e. without subsidies) even without quota regulations.

The fishermens' attitude to catch regulations is another issue. They say that they are willing to accept even strict regulations if they get economic compensation for the days they are ordered to stay ashore.

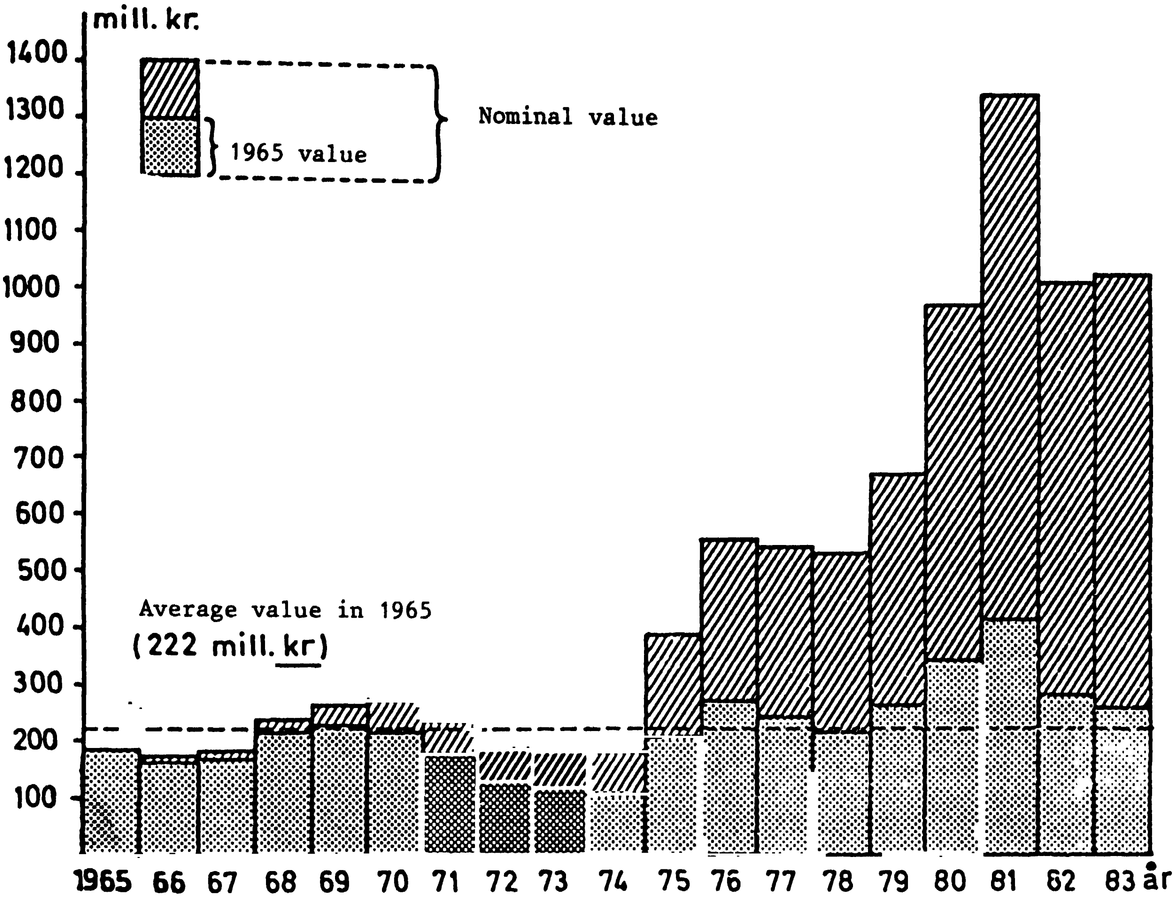
On the other hand, the Government says that the quotas and the subsequent reduced gross income have been taken into account when fixing the annual state economic support to the fishing industry. It is also argued that if 100 per cent compensation were given, one would never get rid of the over-capacity in relation to quotas.

8. INTERNATIONAL MARKET CONDITIONS. GENERAL LOSS OF COMPETITIVENESS

Economic recession in the western industrialized countries from 1974 up to 1982 meant a levelling off in the total demand for fish products. Combined with increased world supply of fish and fish products in the same period (from 67 million tons in 1975 to about 72 million tons in 1980), the general price-level of fish products at the international market had of course a downward trend. The impact of this has been a rather negative tendency in the net income of the fishing industry. This picture is however common for large parts of the "fishing world".

What is special for the Norwegian fishery is the combination of two other facts:

FIGURE 3: State economic[1] support to the fisheries 1965-83. Nominal value. Deflated value.



Source: Parliamentary report No. 93 (1982-83) on Guidelines for a fisheries policy

Figure 3: State economic[1] support to the fisheries 1965-83.
Nominal value. Deflated value.

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[1] "economic" support because minor parts of the yearly amount has been used for purposes other than income support.

Mainly due to its large revenues from oil finds in the North Sea and their incorporation into the national economy, Norway's economic competitiveness has declined over the last 7 - 8 years. Our unit production costs have increased significantly compared with the average for other OECD countries. This is mainly due to increased income level in Norway and a high inflation rate. In addition, expected large oil revenues have increased the value of our currency. When we know that 90 percent of our fish production has to be exported, we can conclude that the fishing industry has experienced reduced net income: i.e.: an even larger reduction than should be expected because of the general weak development on the international fish market.

The sharp increase in the fuel-prices that occured about 1974 and 1979, did, however, not reduce significantly general profitability in the Norwegian fisheries. First, the main fisheries are carried out quite near the coast. The distance to and from the fishing grounds is relatively short. Second, immobile gear and purse seine nets - which are energy saving - are very often used. Fisheries, where mobile gear (normally trawl) are common, were of course hit by the increase in the oil-prices.

Nor have high interest rates significantly affected profitability. The important elements in this context are the international market situations for fish, the domestic cost-level, the availability of fish in the coastal areas and the strictness and type of regulation introduced in the different fisheries.

9. STATE SUBSIDIES. AN IMPEDIMENT TO RESTORED PROFITABILITY

The Fishermen's Association in Norway has the right to initiate negotiations with the Government on state economic support to the fisheries if the Association finds that the fishermen's income most likely will be considerably lower than the average wages in the industrial sector of the economy. Since 1964 yearly negotiations have been carried out and state subsidies have been granted.

As can be seen from Figure 3, the value of subsidies to the fisheries has for the period 1975-83 been above the average for the period 1965-83 as a whole. The major part of the yearly amount has been spent on income support, and the increase in the amount granted can thus be considered to be a type of measure of the decline in real profitability.

This decline is, as mentioned, partly due to external factors such as the general loss of economic competitiveness, depleted fish stocks, subsequent strict regulations and overcapacity in the fishing fleet and processing industry.

On the other hand, were it not for the income support - which over the past years has contributed about 50 percent of the net income in the fishing industry - the fishery as a whole would have responded and adopted to changes in the external conditions. Without the subsidies, the most unprofitable vessels would have been forced to leave fishing and fewer vessels would have been ordered and built. A parallel development surely would have taken place in the processing industry.

Without the income subsidies, the fishery sector would probably have been smaller than to-day and would also have another composition with respect to vessels and gear. Moreover, the fisheries surely would have had a higher real profitability and less need for state support to maintain income levels in the different sectors.

If state income subsidies in the long run do not increase fishermen's income, but only lead to an increase in the participation and the amount of production factors involved in fishing, one would expect a change in the policy that has hitherto been pursued. Since in addition the increased participation in the fisheries is a threat to the fish stocks, one should expect that the Government would have made serious attempts to reduce the economic support. However, if we look at the political goals mentioned in Chapter 2, we soon discover that they are partly contradictory:

- a large fishery sector means preservation of the established pattern of settlement
- reduced income support - and then a shrinkage of the fisheries - means an increase in real profitability.

In the political process, considerations of settlement and social problems, seem to a large extent to have outweighed the goal of achieving improved real profitability.

It should be mentioned, however, that over the past 4 years, the Ministry of Fisheries has carried out extensive scrapping programmes for old and unserviceable fishing vessels with the aim of reducing over-capacity in relation to national quotas, and thus achieve improved real profitability. Without these programmes the economic situation would have been far worse.

10. SCRAPPING PROGRAMMES

The above mentioned scrapping programmes deserves a more detailed explanation and evaluation.

Based on prognoses for the Norwegian catch and quota potential, it became clear about 1976 that the existing catch-capacity far exceeded both present catch possibilities and the catch quotas/possibilities that could be expected in the future. The vessels that made up the excess capacity had no profitable alternative activities. These vessels contributed only to increased total cost and did not significantly increase the gross income to the fisheries, as their vessel-quotas were allocated at the expense of the others. Excess capacity was a heavy burden for the fishing industry and contributed to the increased need for state economic support. The Ministry of Fisheries therefore offered ship-owners who would quit fishing and scrap their vessel a certain amount of money. The maximum amount for one vessel was NKr 6 million, corresponding to about US$ 1 million.

In the years 1979-82, 68 out of 250 purse seiners were scrapped or sold abroad through this scheme. About 20 out of 90 stern trawlers, 10 out of 21 sealers and 22 out of 100 so-called industrial trawlers were, in the same way, taken out of fishing.

It can be contended that the total amount of subsidies spent on these schemes was, in less than one year, effectively reduced due to less need for income support to the fisheries. The scrapping programmes have thus been about the most profitable investments ever made by a Government (100% interest every year for several years to come).

11. FISH FARMING. SHRIMP-TRAWLING

In the previous chapters the unsatisfactory economic situation has been stressed. However, some sectors of the fisheries have experienced a very positive development. The most important ones deserve to be mentioned.

Fish farming has undergone an extremely rapid expansion over the last 5 years. Annual production has increased from approximately 5 000 tons in 1975 to 20 000 tons in 1983. The main species are salmon and trout. The majority of the product is exported.

This part of the fishing industry receives no state subsidies. Nevertheless this sector has hitherto been extremely profitable.

To establish oneself as a fish farmer, one needs a licence from the Ministry of Fisheries. Although few new licences have been granted in recent years (after 1981), production has increased sharply. The size (capacity) of each plant is also limited. Large-scale production is avoided. Most plants are family-owned.

Clean, cold water off the coast and the numerous fiords, bays and inlets seem to create favourable conditions for fish farming. This sector competes successfully with other high wage industries in Norway. It is expected that fish farming will experience further expansion.

Another flourishing activity is shrimp - trawling in the Barents Sea. Catch volume has increased from 19 000 in 1975 to 65 000 tons in 1983. Shrimp trawlers would most likely have had a very satisfactory surplus even without state income support. As subsidies are still paid in this sector, some of the fishermen and vessel-owners have experienced exceptionally high net income. This income level has further stimulated participation in this fishery.

So far it has not been necessary to establish a total quota system for shrimp-fishing in the Barents Sea. However, it has been necessary to ban shrimp-trawling in certain areas and for limited periods, due to high by-catches of young cod and haddock in particular.

12. ADJUSTMENTS IN POLICY

The most important changes in the fisheries policy the past years have been outlined in the pervious chapters:

- from multilateral to bilateral negotiations on preservation efforts;
- stricter national regulations in the fishery;
- extended use of limited entry schemes;
- reduced state income support (although the annual amount is still of great importance);
- scrapping programmes for vessels.

In addition other policy aspects have been adjusted and new instruments have been put into use:

- reduced lending capabilities for the public financial institutions;
- scrapping/restructuring programmes for processing plants;
- less restrictive fish-export legislation;
- increased economic support to research and development projects concerning vessels, plants, products and marketing;
- less restrictive attitudes towards the most efficient units in the fishery sector.

13. CONCLUDING REMARKS

i) A "fair" income level for Norwegian fishermen is guaranteed through government subsidies. Such subsidies have resulted in the maintenance of both the number of fishermen and total capacity in the fishing fleet. They have also stimulated investment in spite of a relatively low level of real profitability. Through its implications on capacity and participation, the policy of the government has meant that fishing quotas are always fully exhausted irrespective of market conditions and costs of production.

ii) In Norway, with its developed industry and its substantial oil-revenues, it is difficult for the fisheries to compete with average income in other sectors of the economy. It can be argued, however, that the fishing industry would be in a position to compete successfully with other sectors of the economy, provided that considerations of social externalities and economic equity were disregarded. An economically optimal fishing industry would nevertheless be smaller than the one we are seeing in Norway at present.

iii) Present fisheries policy in Norway seeks to embody considerations of profitability as well as more general socio-economic factors. Recent developments however, have seen an increased focus on the need to improve real profitability. But wider social considerations still seem to remain important in the formulation of an overall fisheries policy.

TABLE 1

Supporting data

	1970	1975	1980	1982
1) Catch: (1 000 tons)				
a) Cod and codlike species	700	600	620	650
b) Capelin, herring, mackerel etc.	2 100	1 900	1 750	1 700
2) Investments (NKr mil.):				
a) in vessels	ca.200	591	593	
b) in processing plants	177	210	302	
3) Fleet size:				
a) The coastal fleet (over 40 feet and on a full year basis)	1 753	1 542	1 598	
b) The purse seiner fleet				
- Number of vessels	405	295	253	
- Capacity (million hectolitre)	1.22	1.32	1.39	1.16
c) Stern trawlers (mainly cod) of more than 200 GRT No. of vessels	ca. 80	117	124	95
4) Processing plants:				
a) No. of fish meal plants	71	48	36	
Capacity (thousand hectolitres produced per 24 hours)		322	216	
b) Freezing capacity	Number of plants decreased, but freezing capacity increased 25% from 1976 to 1981.			
	1960	1976	1980	
5) Employment:				
a) Fishermen (man-year) on the full year activity fleet of more than 40 feet	14.250	11.450	10.850	
b) Industrial workers (man-year)	14.200		13.700	

THE CHANGES IN CATCHES AND ECONOMIC CONDITIONS OF THE POLISH FISHERY
(prior to and following the establishment of Exclusive Economic Zones)

by

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1. INTRODUCTION

The new legal regime of the sea, concerned with the living resources of the world's oceans, has undoubtedly given impetus to multiform changes in the fisheries of many countries. Not only has a dislocation of the intensity of catches over different areas been observed, but also more weight has been attached to the prospect which some developing countries may achieve. The potential benefit, measured in socio-economic terms, which the new regime is to bring about for mankind had been underlined a number of times by many delegates during the last 15 years of the Third UN Conference on the Law of the Sea. Opportunities for the enhancement of world food supplies have been strongly emphasized; a more just and equal distribution of wealth has been anticipated and praised in many papers; an improvement of national capacity for fisheries management has been viewed by many as the best remedy to avoid both overfishing in some areas and underutilization of living resources in others.

All these hopes may materialize some day. At the moment, we have entered the preliminary phase of this supposedly developmental process. Hence, in starting to try to devise more practical measures, we have to bear in mind that the establishment of the EEZs cannot be regarded as the only factor required in this development process. It had been implicitly stated in the 14th and 15th COFI Sessions held in 1981 and 1983, that the EEZs are obviously a necessary but not a sufficient condition for the extraction of optimum benefits from the available resources within a given EEZ.

More factors have to converge in a coherent manner to give rise, in the case of many countries, to a fishery production on a larger scale. Instead of presenting these in a form of a long and detailed specification which can be found in many papers, we wish to recall the most critical ones, presenting them in a concise manner. They are:

(a) the living resources available (exclusively within the EEZ)
(b) an attractive market (local and foreign)
(c) capital in the form of fishing vessels and inland infrastructure
(d) human skills and knowledge for both management and exploitation of the resources.

As to the degree of endowment in these four factors, we can roughly divide all the fishing nations into four groups:

First, there are some developing countries which, due to a narrow shelf area, may expect within their EEZ a very modest or negligible benefit from the expansion of the offshore fishery. This benefit would not have any considerable bearing upon their Gross Domestic Product (GDP).

Second, many developing countries are in possession of the first factor (considerable resources), but vary in the degree of the possession of the remaining other three.

Third, certain countries (only few in number) are lacking at present in a sufficient access to the rich fishing grounds, but are well endowed with a wide range of other factors like fishing vessels, modern technology, research facilities, training institutions etc.

Fourth, we have also a very specific group of developed countries which enjoy both vast and abundant fishing grounds within their EEZs and already have at their disposal, or can have thanks to their industrial power, all other factors of production at will, if only the growing demand for fish (local or foreign) will call for that.

The authors of this paper aim at making a modest contribution to international cooperation, in the attempt to show whether all 4 of these main factors mentioned could be combined in the cooperation of some countries, particularly those from the second and the third group.

The Polish case is being used in this discussion for two reasons. First, Poland is ranked among the so called "losers" after the establishment of world-wide EEZs. In fact, it has lost many of its traditional fishing grounds (figures are presented in Chapter 2).

Second, Poland possesses fishing vessles, technology and research capacities which, in its opinion, cannot be dissolved. They should be treated instead as a commodity to be traded against the right to fish in some EEZs which are not being rationally utilized. This manner of reasoning indicates an actual presumption of the Polish fishery policy

We have to state at the same time, that after the establishment of EEZ's, the general conditions for such trading (if this term is correct) became evidently favourable for the developing countries. And this appears to be an inspiring phenomenon for all participants involved in any kind of cooperation. To what extent the presumption mentioned can be considered realistic, the policy makers of other countries can assess after reading the details presented below.

2. CHANGING FEATURES OF THE POLISH FISHERY IN THE PAST 50 YEARS

2.1 Specific Factors of Development (Historic sketch)

The Polish fishery is most likely a unique case among all other fishing nations - it owns a fleet with a fishing capacity over 5 times greater than the resources its National Fishery Zone on the Baltic Sea can support and extracts virtually almost 4 times more fish. This assertion as to the real catch stems from the figures noted in recent years and particularly in 1983. Catches may fluctuate as Appendix 2 shows. The fishing capacity of the fleet, however, remains stable for a certain number of years until some vessels are scrapped or added. At the end of 1983 the Polish distant-water fleet consisted of 97 fishing - and - factory trawlers or refrigerating trawlers of 201.6 thousand GRT plus 12 auxiliary vessels of 81.3 thousand GRT. In addition, the number of Baltic side - and - stern trawlers amounted to 545 of 32.5 thousand GRT.

The present fleet of catchers (distant and Baltic ones), then totalling 233.1 thousand GRT backed up by 81.3 thousand GRT of auxiliary vessels, has been capable of easily extracting 0.9 - 1.0 million tonnes of edible fish per year converted to market products plus fish-meal from offals. This computation (in live-weight) is based upon a rather moderate or even low catch-rate per vessel per day attained during the difficult years of the late seventies and early eighties when Polish fishing vessels were being exluded zone by zone from their traditional areas in the North and Central Atlantic and were being forced, in consequence, to roam the seas searching unceasingly for substitute fishing grounds.

If we apply the daily catch-rate which the Polish vessels were able to achieve while exploiting the best fishing grounds at the time of free access, the potential catch capacity of the present fleet (as of 1983) or 233.1 thousand GRT would account for 1.2 million tonnes of fish for human consumption (calculated in live-weight).

The quotas allocated to Poland for its own fishery zone by the International Baltic Sea Fishery Commission have not exceeded, on the average, 180 or a maximum of 200 thousand tonnes within the last years. Hence, the disparity between the catch capacity of the Polish Baltic and the Polish distant-water fleet and the total allowable catch in the Polish zone appears to be amazing. Polish fishery looks like an industry without raw materials, like a hazardous or even ill-fated venture on a large scale. One may run into hasty conclusions that this bizzare fishery may collapse any day.

It seems necessary, then, to cast some light on how the Polish fishery had been conducted to reach such a supposedly staggering position and whether the collapse might actually take place.

We have to look back, way back, to the 1930's. Already during the thirties, there was quite a considerable demand for fish in Poland, mainly for salted herring and canned sprat or sardines. Due to a scarcity of fishing boats and skilled fishermen, this demand was met mostly by imports ranging from 80 to 110 thousand tonnes of fish (product weight) per year.

Within the first two years following World War II, only two factors (out of the 4 required for development) were present in Poland: (a) resources in the Southern Baltic and (b) a huge demand for fish which served to a great extent as a substitute for meat. This demand was additionally boosted by low animal production of the Polish agriculture heavily damaged (or even destroyed in some provinces) during the war.

In a short period of time, however, beginning in 1948 the third factor came into existence to aid the rudimentary Polish fishery. This was the ship-building industry. Before Poland mastered and developed the construction of ocean-going vessels for shipping the fledging shipyards in Gdansk were being used to their fullest capacity to support the national fishery. From 1948 to 1950 several hundred 15 metre side-trawlers with engines 80-120 HP were completed in Polish shipyards. The construction of a number of bigger (50 metres) side-trawlers with 90 HP engines that were to be utilized in expliot-ing the resources of the North Sea commenced at about the same time. Some second-hand 40-50 metre trawlers were also acquired in Great Britain. In this way, during the late forties, Poland suddenly came into possession of a fleet which was excessive in comparison with the availability of skilled crews of Polish nationality. The managers of the Polish fishing enterprises entered, at that time, into agreement with Holland: over 300 Dutch skippers and experienced fishermen and engineers were hired for 3-year contracts for the period 1948-1950. They manned the boats, engaged in catching fish and trained the Poles who were employed as deckhands. This on-the-job training turned out to be a success and was a necessary step before the first 3 schools for fishermen were founded in 1950-1953.

The years 1948-1950 could be termed then as a take-off period (if we wish to use an economic term) or the first breakthrough in the development of the fishing industry. Since then, all four factors of development (resources, market, vessels and skilled personnel) have been at hand propelling the progress of the Polish fishery. Further, Poles had become dedicated fish-eaters. During the next 25 long years up till 1976, Polish fishery was rapidly advancing; an increase of tonnage, catches and market supply was evident almost every year.

This could be exemplified, in brief, by the following figures:-

	1950	1960	1975	1976
tonnage in thous. GRT	26.0	89.0	285.4	326.8
catches in thous. tonnes	66.2	168.3	816.7	776.3
fish consumption per capita:				
- in kgs of live-weight	2.7	5.7	24.1	22.7
- in kgs of final product	1.8	4.2	6.6	6.6

This does not mean, however, that the growth of the fishery had been smooth, coherent, well-coordinated and highly effective year by year.

From time to time one of the four mentioned factors of development either progressed more rapidly or lagged behind the others creating some impediments or bottlenecks in the functioning of the industry. Up till 1976, all these impediments were overcome by the planners or managers, in anticipation of a bright future. In the 60's and early 70's, most of these planners and managers were not aware of the changing times ahead.

2.2 Characteristics of the Fishing Fleet

At the end of the 50's, when the Polish catch accounted for 168 thousand tonnes extracted in equal parts from the Southern Baltic and North Sea, the Government planners started to look around for new fishing grounds, more abundant than those of the Baltic Sea and the North Sea. The managers of some Polish enterprises for some time studied with great interest the results of the impressive British (Salvesen Co.) venture involving the operation of the first fishing and factory vessels Fairtry I and Fairtry II. The same type of venture, although on a larger scale, had been launched by the "Tralflot" Enterprise of the Soviet Union in Murmansk. At this time, the Polish shipyards put forward an offer to construct a series of 15 such sophisticated vessels for the Polish fishery. The shipyards were, at that time, rather export-oriented constantly designing new vessels for both shipping and fishery. They were very interested in using the Polish fishery as a training field for a constant upgrading of quality and performance of that type of vessel in order to become more competitive against foreign European producers. Project studies and economic justifications were carried out pointing to the profitability of expanding the Polish fishery to the New Foundland and Labrador fishing grounds.

All three parties (planners, shipyards and fishing enterprises) came to accord, as a result of which the first fishing-factory trawler "DAMLOR I" completed its maiden voyage at the end of 1960, commencing the noticeable presence of Polish vessels in the North-West Atlantic. They became involved in the exploitation of vast - at that time - underutilized resources, obtaining a high catch-rate and good quality fish. This was a second breakthrough in the development of the Polish fishery.

From 1960 to 1976, 13 types of different size factory or refrigerating fishing vessels were constructed in long or short series. Their specifications are presented in Appendix 1 including the auxiliary vessels and Baltic trawlers.

Concise figures concerning the tonnage and engine power of the Polish fleet for the period 1960-1983 are produced overpage:-

	1960	1965	1970	1975	1980	1983
A. Distant-water fishing (without auxiliary ships)						
- number of vessels	117	139	149	130	115	97
- thousand GRT	51.1	120.7	182.5	201.6	234.8	201.6
- engine in thous. HP	72.3	140.8	201.5	250.0	298.5	270.0
B. Baltic fishery						
- number of boats	524	533	545	498	515	482
- thousand GRT	19.9	25.0	25.8	27.5	33.5	32.5
- engine in thous. HP	60.3	68.8	73.8	85.3	124.3	126.0

The tonnage of deep-sea fishing vessels quadrupled from 1960 to 1983, while the tonnage of Baltic trawlers increased only by 16%. In the Baltic fishery over 90% of the trawlers in existence in 1960 were scrapped and replaced by new, bigger and more efficient boats. Thus, their number remained more or less the same although the total power of the main engines doubled.

We can also note that the number and tonnage of deep-sea fishing vessels started to decline for the first time in 1980; namely, the tonnage from 1980 to 1983 decreased by 33.2 thousand GRT (14.2%). This could be considered as the third turning point of the Polish fishery - differing however, from the first two turning points in 1950 and 1960.

Some more comments, as to the reasons and consequences of this phenomenon are given in chapter 3.

2.3 Catches and the local market supply

Detailed data on the composition of Polish catches and the areas where they were obtained are presented in Appendix 2.

The figures of the local market supply derived from those catches are also presented in detail in Appendix 3. Scanning over Appendixes 2 and 3, every attentive analyst would be able to make a number of interesting observations as to the drastic changes in both the composition of catches and supply and the area of origin of those catches. To facilitate such observations or conclusions, we wish only to add a few clarifying remarks to the figures presented in the Appendixes, which themselves alone do not give a full picture.

The local market supply is derived fundamentally from the national catches. This means that export exceeds import.1) The relevant figures for the main years in five-yea intervals are presented below (in thousand metric tonnes of product weight):

	1965	1970	1975	1980
Final production	152.8	230.2	256.8	317.0
Surplus of export over import	6.0	42.3	33.1	43.7
Domestic market supply	146.8	187.9	223.7	273.3

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1) this statement is valid from 1962; until 1962 import prevailed over export.

We can see from Appendix 2 that the catch of herring visibly declined from its peak quantity of 136.2 thousand tonnes in 1971 down to 82.3 thousand tonnes in 1983. This resulted from the necessity of a gradual withdrawal of Polish vessels from the North Sea and the Norwegian Sea, eventually confining the herring fishery to the National Zone in the Baltic. The collapse of mackerel fishery from its maximum figure of 160.4 thousand tonnes was caused by a staged withdrawal of Polish fishing boats from the North Sea commencing in 1974 and then, in turn, from the Mauretanian EEZ in 1979.

The catches of cod diminished similarly in the North Atlantic and, in the last years have been confined almost exclusively to the Polish Baltic Zone.

From 1973, in the Peruvian and in other EEZs, the capture of hake in place of cod was begun and continued on a large scale until 1981. Following the decline in the supply of cod and hake, the Polish fishery resorted to catching blue whiting, the amount of which increased by 1983 to 233.1 thousand tonnes extracted in the open waters of the South-West Atlantic.

In search of a substitute for the heavy losses in mackerel, cod and hake, the Polish fleet also commenced, on a large scale, the exploitation of horse mackerel and squid resources in the open oceans (beyond anybody's EEZ) - the last two columns of Appendix 2 clearly show this.

Thus, the changes in the exploitation intensity of different areas were accompanied by alterations in the composition of the species caught and the latter development resulted from the former.

Both changes, however, have their roots in the world-wide establishment of the EEZs and the retreat, in turn, of the Polish fishing vessels from the fishing grounds which they had traditionally exploited.

We have to add that there were two most 'painful' two-year periods for the Polish deep-sea fishery in this respect. First - in the years 1977 and 1978 when some coastal states introduced EEZs in areas most vulnerable to the Polish fishery. Second - in the years 1981 - 1982 when some joint-ventures or fishery agreements between Poland and some other states (mainly Peru, Senegal and the United States) were suspended or expired. This is also visible from the lower figures describing catches in those years presented in Appendix 2.

But still, all these constraints and obstacles did not entirely damage the Polish distant-water fishery as the catch figures and the market supply in 1983 proved. The fishery reclaimed the position of its most successful days on the oceans of the world. The output, measured by the quantity of fish extracted per fisherman also increased in 1983 above the average of the 1970's as Table 1 indicates.

Two other aspects of the fishery's activity declined, however, most probably with no hope for improvement. The first concerns the quality of market supply. From 1977 on, consumers were being offered less fish of their preference, instead they were receiving simply what the fleet brought ashore.

The second aspect boils down to the costs and earnings of the fishery and its ability to re-invest in the construction of new vessels to replace those destined to be scrapped in the period 1986-1990 and 1991-2000.

That is the point to be considered in the next chapters.

TABLE 1

Catch of edible fish (per one fisherman employed from 1960 to 1983 in metric tonnes of live weight per person).

YEAR	in the Baltic fishery	in the distant-water fishery	Average in the Polish fishery
1960	16	30	20
1963	18	33	23
1965	18	39	27
1968	23	36	29
1970	27	39	32
1971	27	43	35
1972	29	44	36
1973	30	48	38
1974	32	47	39
1975	37	47	42
1976	34	49	41
1977	32	50	41
1978	33	42	36
1979	38	49	42
1980	39	54	45
1981	38	40	37
1982	35	37	36
1983	32	50	41

3. THE IMPACT OF THE ESTABLISHMENT OF THE EEZs UPON THE POSITION OF THE POLISH FISHERY

3.1 Areas and Distances

In talking about the impact of the establishment of EEZs, we are referring to the distant-water fishery, as the Polish Baltic fishery neither suffered nor gained anything under the new legal regime.

The first and most striking negative effect for the Polish fishery was the need to withdraw its trawlers from the newly established EEZs which meant, in practice, the renouncement of certain quantities of fish those vessels could have easily extracted. Table 2 presents the quantities caught during the last year prior to the introduction of the EEZs (column 2 shows different years, since EEZs were being established at different periods in the various areas) and the actual (reduced) catch afterwards.

TABLE 2

Quantities of fish caught by the Polish fishery prior to and following the establishment of the EEZs (in thousand tonnes live-weight).

Region	the year prior to the establishment of the EEZ	actual catch in the last year of free access	actual catch in 1983	the loss (difference) calculated on an annual basis
1	2	3	4	5
North-East Atlantic	1976	124.5	0.9	123.6
North-West Atlantic	1975	187.5	13.3	174.2
Central-East Atlantic	1977	203.4	-	203.4
South-East Atlantic	1978	164.1	114.1	50.0
Sub-total 1st Phase		679.5	128.3	551.2
North-East Pacific	1981	165.6	13.7	151.2
South-East Pacific	1980	161.0	40.0	121.0
Sub-total 2nd Phase		326.6	53.7	272.9
TOTAL		1006.1	182.0	824.1

There were two 'waves' of compulsory withdrawal of Polish vessels. The first one took place in a rather short period of time within one or two years upon receiving official signals that Government debates concerning the establishment of a zone by a given State appeared to be in a final stage. During this first stage, Poland had to renounce 551.2 thousand tonnes as shown in column 5 of Table 2. Obviously, other fishing grounds were found either in the EEZs of other countries following an agreement or substitutes were found on the open seas.

The second wave hit the Polish fishery when the agreements with some countries like Peru or the United States permitting fishing in their EEZs expired or were suspended. This second phase resulted in a loss of 272.9 thousand tonnes. In this last case, the only substitute areas for exploitation could be, and finally were, found on the open seas. Eventually, over 75% of the Polish distant-water catch in 1983 was taken from open sea resources and less than 25% was extracted within the framework of joint-ventures in foreign EEZs.

This kind of permanent redeployment of fishing vessels lasting 8 years had a clear detrimental effect. It led mainly to an increase in the distance from domestic harbours to fishing grounds and to a decline in the composition of catches; horse mackerel or squid caught out of necessity as a substitute could not compete in market value with the lost quantities of cod, hake or herring.

The following row of figures shows the degree to which the average distance from Polish harbours to the fishing grounds increased in the times of compulsory redeployment of the fleet (in nautical miles):

Year	1975	1978	1980	1983
Average distance	4,033	6,690	7,659	8,242

Putting aside for the moment the increase of operating costs incurred to the enterprises as a result of this gigantic redeployment, we will produce figures reflecting the drop of the market value of catches due to the decline of their composition. Since the Polish zloty is not a convertible currency, the catch value is presented in US$ (using the 1979 prices as a basis). Since almost every fish product obtained from national catches is either exported or similar products are imported to enrich the market, relevant US$ prices of these import-export transactions were applied to the entire output of fishery. The results are presented in Table 3:

TABLE 3

Value of Polish catches in US$ million (1979 prices as a basis).

YEAR	Value in million			reduced value as compared to the peak year 1975		Index 1975=100	Index 1970=100
	deep-sea fishing	in Baltic fishery	total	in deep-sea fishing	total deep-sea and Baltic fishery		
1965	76.0	39.1	115.1			35	62
1970	119.3	67.6	187.0			56	100
1971	138.0	66.6	204.6			61	109
1972	141.8	73.0	214.8			64	115
1973	169.1	74.1	243.2			73	130
1974	208.5	83.9	292.4			88	157
1975	234.6	98.7	333.3			100	178
1976	224.1	92.5	316.6	10.5	16.5	95	169
1977	199.8	88.5	288.3	34.8	45.0	86	154
1978	187.1	80.7	267.8	47.5	65.5	80	143
1979	235.0	91.1	326.1	0.4	7.2	98	174
1980	221.3	102.4	323.7	13.3	9.6	97	173
1981	168.4	96.8	265.2	66.2	68.1	80	142
1982	143.1	97.6	240.7	91.5	92.7	72	129
1983	209.4	80.4	289.8	25.2	43.5	87	155
value reduced within 8 years				288.6	348.3		

After presenting the figures in Table 3, all comments as to the magnitude of the decrease in the value of output of the Polish fishery appear to be superfluous except for two. First, the value of output was continuously declining from 1975 although the tonnage of fish catchers and auxiliary vessels increased up to 1983 by 30.1 thousand GRT, (10.5%).

Second, the reduced value of 288.6 US$ million accrued in an 8-year period shown in the Table could fairly have been used for re-investments in the Polish fishery or in joint ventures with some developing countries if such ventures had been concluded to the benefit of both parties.

Hope for the future, however, is not being abandoned and Poland would be prone to negotiate any sound project in fishery cooperation.

3.2 PROBLEMS IN THE MARKET SUPPLY

A number of observations can be made in reviewing Appendix 3. We would wish to add that fillets produced initially from cod and red-fish are, at present, also being made from blue whiting and even horse mackerel, so that the production that visibly dropped after 1975 recovered in the early eighties. The same could not be said about salted fish, the supply of which dropped from 1975 and 1976 levels due to a decline in herring catches. Herring and sprat caught in the Baltic supports first and foremost the canning factories so as not to leave them standing idle.

The production of ready-to-serve fishes doubled from 1975 to 1981 and following a decline in 1983 is expected to increase rapidly within the next few years.

Some obstacles appeared with regard to the sale of squid and horse mackerel in Poland. Consumers, traditionally prefering cod, hake, herring and sprat did not, at first, accept the substitute fillets or canned fish made from horse mackerel with great enthusiasm. The sale of squid through specialized retail shops faced real difficulties stemming from a prejuidce towards a different kind of sea food. It was extremely hard to sell squid in Poland, although it was being offered at very low retail prices. It appears, however, following a year of extensive promotion, that eventually a successful way has been found to obtain the consumers' acceptance. An outlet has been found in institutional buyers. The consumption of squid has been on the increase in restaurants since the end of 1983 when it started to be served in a way not resembling its original natural shape. The researchers surveying the demand noticed recently that in some cities the number of people placing squid (in a form of a prepared dish) on their list of favourite food started to increase rapidly.

Thus, it is justified to make an assumption that fillets, smoked or canned products from horse mackerel and blue whiting and restaurant dishes prepared from squid shall finally be accepted and purchased like cod or hake. If this assumption proves correct the demand for fish products at large will once again increase in Poland. It will not, however, resemble the rapid rate which was the case in the sixties and the beginning of the seventies. Meanwhile, for reasons listed earlier, the consumption of fish dropped slightly following a steady growth from 1960 to 1976, as the following figures indicate:

TABLE 4

Consumption of final fish product in Poland in kgs, per capita, per year, in the period: 1960 - 1982

Product Year	1960	1965	1970	1975	1976	1977	1978	1979	1980	1981	1982	1983
Marine fish	3.8	4.3	5.3	6.0	6.6	6.4	6.2	6.6	7.2	6.3	5.0	5.8
All marine and fresh-water fish	4.2	4.6	5.9	6.6	7.2	7.0	6.9	7.2	7.7	6.9	5.5	6.3

The consumption presented in Table 4 has been calculated in final products.

4. CHANGES IN ECONOMIC INDEXES PRIOR AND FOLLOWING THE ESTABLISHMENT OF THE EEZs

4.1 The costs of fishery production

The unit costs of production in the Polish fishing industry have been constantly increasing and, in particular, the costs of fishing operations in distant waters. Making a first approach to this problem, we wish to present the general figures of the unit costs per 1 kg of fish caught during the period: 1970-1983 in US$.

TABLE 5

The changes in the cost of catches in the Polish fishery from 1970 to 1983 (in US$ per 1 kg of edible fish live-weight)

YEAR	Distant-water fishing in US$	Baltic fishery in US$	Indexes: 1970=100	
			Distant-water	Baltic fishery
1970	0.23	0.15	100	100
1971	0.25	0.16	109	107
1972	0.27	0.16	117	107
1973	0.27	0.17	117	113
1974	0.32	0.16	139	107
1975	0.34	0.17	148	113
1976	0.36	0.19	156	127
1977	0.38	0.20	165	133
1978	0.38	0.20	165	133
1979	0.39	0.20	169	133
1980	0.42	0.21	183	140
1981	0.48	0.25	209	167
1982	0.52	0.27	226	180

Note: The costs were converted from Polish zlotys to US$ by comparing the European prices for all materials used by Polish boats, though applying the official rate of exchange for renumeration of the Polish crew.

The figures in Table 5 include all operation costs plus the depreciation and plus the administrative costs of fishing enterprises.

The authors of this paper were not able to collect a full set of data concerning the cost increase in all the fishing nations. Being in possession, however, of certain information from some South-East Asian and South American nations and also from selected European countries, we may assume that the scope of increase in the Polish Baltic fishery (by 80% during the last 13 years) was close, though slightly less than that in the off-shore fishery in most fishing nations of the world (by off-shore fishery we mean fishing operations being carried out within the radius from 12 to 400 nautical miles from the harbour).

The reasons for such an increase (fuel prices, higher renumerations, etc.) have already been presented in certain papers for the use of FAO, so there is no need to discuss further this topic.

The cost of the Polish distant-water fishery may draw some more attention. After all, there are only few other nations with a fleet so dependent on the spirit of co-operation of other countries with vast and productive EEZs. Poland could even be considered, as we hinted at the very beginning, as a unique fishing nation fighting for access to fishing grounds. No wonder that the unit costs increased during the last 13 years as much as by 126% as Table 5 point out. Therefore, the basis for some elements of the unit costs should be produced in a more detailed manner.

4.2 The problem of fuel prices

Here again, in mentioning fuel prices, we are touching on a matter which is familiar throughout the world. Not only fishermen are complaining about the unprecedented and likely unrepeatable steep increase of fuel prices from 1973 to 1982. In the Polish fishery, we shall only mention the surprise caused by this price-hike. Polish planners and managers of fishery enterprises did not ignore the first hint they received during the Third Session[1] of the Third LOS Conference regarding the introduction of the EEZs. They began, as much as was then possible, to prepare a background for cooperation to allow them to exploit some future foreign EEZs. The first joint-venture on a big scale was established with Peru in 1973. Various alternative precautionary measures were planned between 1974 and 1979 concerning the manner of meeting the challenge of the EEZs. Almost nothing, though, had been prepared to deal with the awesome fuel price increase except for a speeding up of the construction of engines for the new vessels using heavy fuel instead of diesel oil. The managers were entirely taken aback and left helpless in the face of this problem. The situation was aggravated when Polish fishing vessels were forced to shift their operation to more distant areas, particularly from 1977 and again from 1981. For these two reasons the cost of fuel consumption per 1 ton of fish caught has been increasing at the rate shown in Table 6.

TABLE 6

Cost of fuel consumption in Polish fishery in US$ per 1 ton of fish caught (in live-weight) for the period: 1970 - 1982.

No	Year	Cost in US$ per 1 ton of fish caught		Indexes of growth 1970=100	
		Deep-sea fishing	Baltic fishery	Deep-sea fishing	Baltic fishery
1	1970	16.9	6.7	100	100
2	1971	19.0	8.0	112	119
3	1972	20.1	9.2	119	137
4	1973	36.7	12.3	217	183
5	1974	56.6	14.6	335	218
6	1975	58.7	15.5	347	231
7	1976	63.1	18.7	373	279
8	1977	63.6	24.4	376	364
9	1978	74.4	26.7	440	398
10	1979	127.3	28.6	753	426
11	1980	128.9	33.0	763	492
12	1981	133.5	32.9	790	491
13	1982	149.7	31.7	886	473
14	1983 [a]	136.1	31.4	805	468

[a] Provisional figures

We produce Table 6 without comments except for one - that the fuel consumption costs had the biggest impact on the general unit costs presented in Table 5.

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[1] in Caracas

4.3 Capital Outlay

The fishing industry in Poland had been from the late forties till the mid-seventies a consistently profitable venture. The Government was able to allot money for new expanded investments by way of taking over from the enterprises the sums of depreciation and most of the net income. Table 7 shows the rate of increase in the net value of fixed assets of the Polish fishing industry at the end of each year during the period: 1965 - 1982.

TABLE 7

The net value of capital outlay (fixed assest) including fishing boats and inland processing plants calculated in US$, 1979 prices as constant.

Year	Fishing vessels in US$ mil.	Inland processing plants, cold stores, etc. in US$ mil.	Total net value of capital outlay in US$ mil.
1965	108	31	139
1970	180	43	223
1971	191	62	253
1972	222	67	289
1973	240	72	312
1974	248	89	337
1975	271	95	366
1976	345	103	448
1977	416	112	528
1978	412	121	533
1979	401	131	532
1980	405	137	542
1981	376	142	518
1982	430	150	580

Comment: 1) All figures rounded up to US$ million
2) The net value means the purchasing value reduced by the value of depreciation for the relevant period
3) For converting the value from zlotys to US$, the official rate of exchange was used

As Table 7 indicates, the value of fishing vessels was on the increase up to 1977 (416 US$ mil.) and corresponded to the increase in tonnage as presented in Appendix 1. In August 1977, following lengthy debates with managers, the Government decided (ignoring opposing views of some managers) on a precautionary considerable decrease of investments in deep-sea fishing. Starting from 1978 and lasting till 1983, no new orders were placed in shipyards; this did not influence, though, the construction of vessels which had started before August 1977. The decision to halt all investments in deep-sea fishing was modified slightly with reference to 3 auxiliary vessels which had to be added to the existing 9 in 1978, due to an increase in the operation distances. Apart from this, as an exception to the general Government decision, 3 prototypes of new fishing-and-factory vessels were constructed in the period 1980 - 1983.

Simultaneously, the scrapping of some old fishing vessels was speeded up by 3 or 4 years in comparison to the technically possible life-time of their operation.

For the above mentioned reasons, we see some fluctuations with respect to the tonnage and value of the fishing fleet (presented in Appendix 1 and Table 7) during the period 1978-1982 against the steady growth observed up till 1977.

In addition to the discussion of the value of fixed assets, we wish to present (in Table 8) the changes in the capital output ratio (COR) in Polish fishing industry in the years 1965-1982.

TABLE 8

Changes in the capital output ration in the Polish fishing industry during the period 1970 - 1982, based upon the prices constant of 1979 in US$

Year	Net value of fixed assets in US$ mil	Value of the fishery production in US$	Capital Output Ratio (COR)
1965	139	115.1	1.21
1970	223	187.0	1.19
1971	253	204.6	1.24
1972	289	214.8	1.35
1973	312	243.2	1.28
1974	337	292.4	1.15
1975	366	333.3	1.10
1976	448	316.6	1.41
1977	528	288.3	1.83
1978	533	267.8	1.99
1979	532	326.1	1.63
1980	542	323.7	1.67
1981	518	265.2	1.95
1982	580	240.7	2.41
1983	588 (provisional)	289.8	2.03

The capital output ratio - most favourable and almost constant in the years 1965-1975 started to deteriorate in 1976, arriving in 1982 and 1983 at an index over 2.

To provide the readers with some more details, the COR is presented separately for the distant-water fishery and for the Baltic fishery in Table 9.

TABLE 9

Capital output ratio in the distant-water fishery compared with the Baltic fishery in selected years calculated on the basis of US$ (1979 prices as constant)

YEAR	Net value of fixed assets in US$ mil	Value of market products in US$ mil	COR	Net value of fixed assets in US$ mil	Value of market products in US$ mil	COR
	distant-water fishery			Baltic fishery		
1965	104	76.0	1.37	35	39.1	0.89
1970	181	119.3	1.52	42	67.7	0.62
1971	201	138.0	1.46	52	66.6	0.78
1973	252	169.1	1.49	60	74.1	0.81
1975	290	234.6	1.24	76	98.7	0.77
1978	443	187.1	2.37	90	80.7	1.11
1980	442	221.3	2.00	100	102.4	0.98
1981	416	168.4	2.47	102	96.8	1.05
1982	475	148.1	3.20	105	92.6	1.13

Now we can clearly see the differences in COR between the two kinds of fishery: the first one dependent on the resources in foreign EEZs or open seas and the second one operating within the Baltic fishery zone.

In additon to the observation above, we may firmly assert that the capital output ratio rose enormously from 1975 (1.24) to 1978 (2.37) in the distant-water fishery, i.e., during the period when Polish vessels were forced to exercise a gigantic redeployment and when the catch composition declined.

After producing the set of economic indexes (unit costs, fuel consumption and COR), we have to ask the question whether they turned out to be really so discouraging as they appear at first glance. This question should be answered in a most serious manner.

5. BACKGROUND FOR DRAFTING NEW PLANS FOR DEVELOPMENT AND FOREIGN COOPERATION

5.1 Criteria for decision making

Following 8 years of continuous redeployment of the Polish distant-water fleet and search for new fishing grounds, it has become clear that the Polish fishery has been able to overcome all obstacles and pit falls resulting from the establishment of the Exclusive Economic Zones. This fishery has not become cut off from the resources in a broader sense, since new fishing grounds were found in the open seas (beyond the EEZs). Thus, the first factor of production was not lost; three others, that is, vessels, the market and skilled men were never lacking - they could have only been jeopardized (to a certain degree) if the new possibilities of exploiting the open seas had not been discovered. Thus, we can assert that distant-water fishery still persists, at least at present, and extracts considerable quantities of fish for the domestic market supply.

At the moment, however, three other problems come into view which need to be resolved in order to continue long-term development.

The first one refers to the question of whether it pays to continue the distant-water fishery versus some other alternative strategies that could be pursued in maintaining or even upgrading the level of food consumption. The second one concerns the scale of fishery production in the more distant future.

The third one refers to the scope, conditions and new practical measures to be applied in entering into foreign cooperation in fisheries.

In attempting to respond to the first question, we have to apply the kind of yardstick traditionally used by planners for decision-making in the allocation of funds between agriculture and fishery in Poland. This is a comparative analysis of animal protein production costs in different groups of foodstuffs.

Table 10 shows the indexes of the costs of animal protein production derived from 3 groups of commodities based on records in Polish zlotys during the period 1966-1982.

TABLE 10

Indexes of the costs of net animal protein production in Poland in the period 1966 - 1982 (1960=100)

Year	Meat	Fish	Dairy products
1966	100	100	100
1970	101.8	101.7	95.4
1971	95.8	120.8	104.3
1972	87.3	140.0	113.3
1973	91.7	141.4	120.6
1974	101.2	188.0	142.6
1975	119.6	240.8	165.3
1976	140.6	237.2	164.5
1977	157.2	289.8	167.4
1978	170.9	327.1	169.4
1979	225.2	317.2	184.1
1980	257.7	354.9	292.8
1981	392.3	362.7	408.7
1982	559.3	675.1	648.7

The above mentioned costs are also expressed in Table 11 in absolute figures. i.e. in US$ per 1 kg of net protein, converting zlotys to US$ using the official rate of exchange.

TABLE 11

Costs of net animal protein production in Poland in US$ per 1 kg of protein during the period: 1966 - 1982

Year	Meat	Fish	Dairy products
1966	6.85	4.20	3.32
1970	6.97	4.25	3.16
1971	6.59	5.08	3.46
1972	5.99	5.88	3.75
1973	6.28	5.94	3.98
1974	6.07	6.90	4.14
1975	7.19	8.86	4.79
1976	8.43	8.73	4.77
1977	7.50	9.48	4.32
1978	7.45	8.73	3.57
1979	9.82	8.42	3.88
1980	11.24	9.50	6.17
1981	17.10	9.70	8.62
1982	15.78	11.69	8.86

The above mentioned figures are also exposed in a form of Figure 2 (next page).

There are minor discrepancies between the trends of increase of the costs of animal protein production expressed in index based on Polish zlotys and those expressed in US$ due to changes in the rate of exchange in different years.

Nevertheless, the planner may conclude that the outcome of this evaluation provides him with a clear-cut measure for decision making. While the rate of increase of cost of production of fish was greater than that of meat and dairy, the cost for fish is still lower than that for meat in absolute terms. Thus, the distant-water fishery should be continued. Actually, this is only a first step towards a final decision on whether to invest Government funds or not.

5.2 Scale of production and development

Awareness of the fact that it is technically possible for the Polish distant-water fishery to exist, and that it can continue providing the consumers with animal protein cheaper than that obtained from meat, is still not sufficient to justify the investment of large amounts of money.

Protein, as such, is not marketed and must be delivered to the consumers in the form of preferred commodities. By the same token, the real demand and price elasticity, radically changed in recent times, plays even a bigger role than the planners' evaluation based upon the pure protein method.

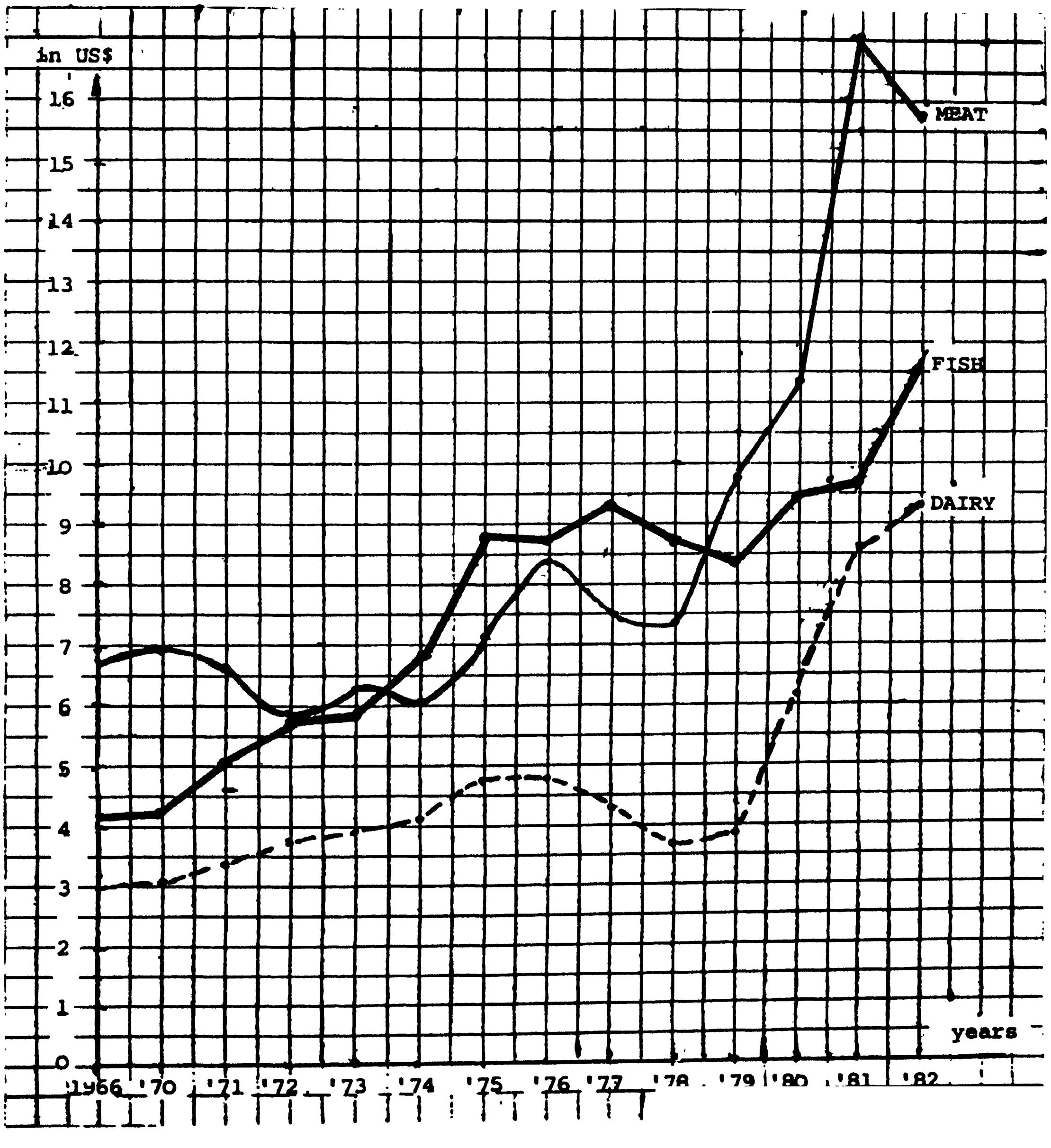

FIGURE 2: Protein production costs in US dollars/kg in the years 1966-1982

The price elasticity of demand will continue to be measured in the calculations of fishing enterprises for some time to learn whether these calculations are compatible with the central planners'evaluation based on the pure protein intake method. This will lead, at the same time, to a conclusion whether Government subsidies will be needed to support the actual level of fishing operations. We must add that the Polish fishery generated profits from 1948 to 1974. From 1975 some subsidies were allotted to the deep-sea fishing enterprises from the central budget. The value of these subsidies increased in 1979 and then after some fluctuations from 1980 to 1982 dropped visibly in 1983. There are strong views held by some fishery administrators in Poland regarding the usefulness of subsidies. They voice their support rather for a model of self-sufficient and self-propelling enterprises relying exclusively on market forces. There are others who maintain, instead, that the production of some crucial commodities like meat and fish will call for subsidies for socio-economic reasons.

Independently of the above, a series of economic analyses have been carried out from 1977 to 1983 in Poland concerning the costs and earnings obtainable in different fishing areas. The outcomes turned out to be most interesting.

Profitability appears to be highly dependent on the aggregate value of the catch composition obtainable in practice by big trawlers on different fishing grounds on which they are authorized to fish. For example, the aggregate value of the catch composition in recent years is as follows: the North-West Atlantic - 668 US$ per metric ton of live-weight; most fishing grounds of the South-West Pacific - 460 US$; the South-West Atlantic - 387 US$, with a tendency to increase when the share of squid increases; the Central-East Atlantic - 241 US$; the South-East Pacific - 285 US$. These values refer only to the composition extracted from big schools securing a high catch-rate and do not refer to rare valuable fish caught close to the shore by local fishermen in those areas.

The unit cost on some 'low-value' fishing grounds mentioned is higher than the earning harvested there. The calculation would, however, turn out to be more profitable when the operations are being waged from foreign ports located closer to those 'low-value' fishing grounds.

If the position of the Polish distant-water fishery remains, in terms of access to the fishing grounds, on the level of 1983 (when almost all the catch came from the open seas), the "economies of scale" can play a most decisive role. In simple words, Poland may discard its previous plans to exploit 'low-value' areas.

It would probably mean, in practice, that the Government will fix a desirable level of fish consumption per capita per year of 7 kgs in product weight (20 kgs in live-weight). One-third of this figure would be made up from catches in the Polish fishery zone in the Baltic Sea and two-thirds mostly from open seas. It would also mean that vessels that are to be scrapped from 1986 to 1990 will be replaced by new ones, so as to retain the catching capacity on the level of 1983 (tonnage in GRT might be slightly lower).

This is the decision expected by the authors of the paper, although not confirmed by the Government. In order to make a final and decisive move to reinstate the construction of distant-water fishing vessels which had been halted in 1977, additional project studies must be completed, some of them concerned with the long-run cooperation in fisheries with other countries.

5.3 A new approach to foreign cooperation in fisheries

The Polish case proved during recent years, that the distant-water fishing operations of this nation need neither decline nor collapse.

Most probably, three factors have converged to make it possible to continue with these operations:

First, there were moderate catches amounting roughly to 0.6 million tonnes (after excluding the Baltic operations of 0.2 million tonnes) scattered all over the world's oceans and this capture does not pose any serious threat to anybody's benefit;

Second, the exploratory operations which had been shifted to the open seas were successful as, luckily, new resources were found, not tackled by anybody else.[1]

Third, the fishing fleet, the inland infrastructure and research institutions which had been developed for many years continue to exist and are too expensive to be left idle or to be dissolved.

Notwithstanding all these specific (though costly) successes which make the Polish fishery entirely independent from the EEZs of other countries, we deem that foreign cooperation should not decline or be disregarded by the Polish side.

On the contrary, the need for international cooperation has increased under the new legal regime. Reasons for this have been listed and justification has been provided in different papers completed by the FAO members and at meetings of experts.

We wish to add only a few words presenting our views based upon the knowledge of the Polish economic position, in general, and that of the fishery in particular.

Poland cannot afford to provide extensive aid (in the literal meaning of the word, i.e., charity work) on a major scale to boost the fishing operations of developing countries. The Polish distant-water fishery is most interested in being accorded the fishing rights in the EEZs of other countries where the resources are not being fully exploited. In a number of cases, the operating costs within the EEZs are lower per unit of catch than costs on open seas. Polish fishing enterprises obviously offer to share the margin of benefit resulting from the difference in costs connected with operating on the open seas and those within anybody's EEZ. Those margins, familiar (in actual figures) to Polish enterprises, differ for various EEZs and the ability to pay fees by these enterprises for granting them access differs also.

The fees can be transfered in many ways: from cash to a wide array of assistance in services, capital outlay and technology. Research aiming at assessing the biomass and the total allowable catch in a given EEZ can be provided in advance. This, however, must often be combined with fish scouting to evaluate the commercial catch-rate that is possible.

The compliance of the Polish distant-water vessels with the regulations issued within the EEZs and the responsibility of the flag state is, in our opinion, a matter beyond any discussion.

The authors of this paper, having had the chance to familiarize themselves not only with the papers and views expressed but also with the first practical experiences in the realm of cooperation between coastal and distant-water states, were surprised by how many misunderstandings had slipped into some agreements concluded fundamentally in good faith by both parties.

We are of the opinion that the Expert Consultation on the Conditions of Access to EEZs, held in Rome from 11-15 April 1983 and the 15th COFI Session in October 1983, contributed considerably to both finding ways to expand international cooperation on many levels and to the practical manner of interpreting some notions created by the new UN-Convention on the Law of the Sea.

Many problems were discussed during the above mentioned Expert Consultation[2] concerning the distant-water States - and, from these, we consider the following to be most important for Poland:

1) stable arrangements with coastal states
2) fees based on actual catches and the value of species

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[1] Apart from locating some new resources of fish and squid, Poland launched a big research programme of catching and processing the Antartic krill; some information on this is produced in a separate paper.

[2] see: para 76 (page 9) of the FAO Fisheries Report No 293 (FIPP/R293 En)

3) simplicity in conditions and regulations
4) access to resources to ensure their optimum utilization

If the licence to fish is issued to foreign vessels for a short period (eg. one year) and the fee is levied on the basis of the GRT - it simply forces these vessels to catch the biggest quantity possible in a predatory fashion, with no regard for long-range benefits and a rational management of fish resources within the EEZ.

The Polish distant-water fishery will avoid entering into that kind of short-term and unstable agreement, no matter how big the profit from such might be.

We do hope that this fragmentary information and views stemming from the Polish experience can contribute at least to a small degree to the strengthening of international cooperation under the new legal regime governing the exploitation of the resources of the world's oceans.

APPENDIX 1

POLISH FISHING FLEET - NUMBER OF VESSELS AND TOTAL TONNAGE BY,SIZE (GRT) AND TYPE
FOR THE YEARS 1970 - 1983

thousand GRT

TYPE OF VESSEL	1970		1971		1972		1973		1974		1975		1976		1977		1978		1979		1980		1981		1982		1983	
	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thousand GRT	number	thou sand GRT
DEEP-SEA FISHING VESSELS:																												
Drifter trawlers B-11, B-17	25	4.5	12	2.2	2	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Side-trawlers B-10, B-14	53	34.6	52	33.9	49	32.6	43	28.6	38	25.3	35	23.4	33	22.0	11	7.2	2	1.3	1	0.7	1	0.7	1	0.7	1	0.7	1	0.7
Fishing trawlers B-20	14	11.1	14	11.1	14	11.1	14	11.1	14	11.1	14	11.1	14	11.1	14	11.1	14	11:1	13	10.5	13	10.5	12	9.6	11	8.8	11	8.8
Factory trawler B-15	21	59.1	21	53.6	21	51.6	21	49.6	21	48.6	21	48.6	21	48.6	21	48.6	21	48.6	21	48.6	21	48.6	10	23.2	10	23.3	10	23.3
Refrigerating trawler B-23	11	15.1	11	12.5	11	12.5	11	12.1	11	12.1	11	12.1	11	11.0	11	11.0	11	11.0	10	10.0	9	9.0	10	10.0	4	4.0	4	4.0
Factory trawler B-18	9	27.9	9	22.4	9	22.4	9	22.4	9	22.4	9	22.4	9	22.4	9	22.4	9	22.4	9	22.4	9	22.4	9	22.4	5	12.4	5	12.4
Factory trawler B-22	5	13.9	6	16.1	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5	8	21.5
Factory trawler B-29	11	16.3	11	16.3	15	22.2	18	26.8	18	26.8	18	26.8	18	26.8	18	26.8	18	26.8	18	26.5	18	26.5	18	26.5	18	26.5	18	26.5
Factory trawler B-418	-	-	4	10.0	4	10.0	6	15.0	6	15.0	7	17.4	9	22.3	14	34.5	14	34.5	14	34.5	14	34.5	14	34.5	14	34.5	14	34.5
Factory trawler B-414	-	-	-	-	-	-	-	-	-	-	1	2.6	4	10.4	7	18.2	7	18.2	7	18.2	7	18.2	7	18.2	7	18.2	7	18.2
Factory trawler B-419	-	-	-	-	-	-	1	2.7	5	13.3	5	13.3	5	13.3	5	13.3	5	13.3	5	13.3	5	13.3	5	13.3	5	13.3	5	13.3
Factory trawler B-417	-	-	-	-	-	-	-	-	-	-	1	2.4	6	14.4	9	21.6	9	21.6	9	21.6	10	24.0	10	24.0	10	24.0	9	21.6
Factory trawler B-89	-	-	-	-	-	-	-	-	-	-	-	-	1	2.6	2	5.2	2	5.2	2	5.6	2	5.6	2	5.6	2	5.6	2	5.6
Factory trawler B-407	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	3.7	2	7.4	3	11.2
Sub-total	149	182.5	140	178.1	133	184.3	131	189.8	130	196.1	130	201.6	139	226.4	129	241.4	120	235.5	117	233.4	115	234.8	107	213.3	97	200.2	97	201.6
AUXILIARY AND TRANSPORTING VESSELS:																												
Factory mother-ship B-67	2	27.7	2	27.7	2	27.7	2	27.7	2	27.7	2	27.7	2	27.2	2	27.7	2	27.7	2	27.2	2	27.2	2	27.2	2	27.2	2	27.2
Factory mother-ship("Kaszuby")	1	8.3	1	8.3	1	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fish-carrier ("Piast")	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2	1	3.2	-	-	-	-	-	-	-	-	-	-	-	-
Refrigerating fish-carrier B-433	-	-	-	-	3	15.8	3	15.8	3	15.8	3	15.8	3	15.4	3	15.4	3	15.4	3	15.4	3	15.4	3	15.4	3	15.4	3	15.4
Refrigerating fish-carrier ("Harmattan")	-	-	-	-	1	1.8	1	1.8	1	1.8	1	1.8	1	1.7	1	1.7	1	1.7	1	1.7	1	1.7	1	1.7	1	1.7	1	1.7
Refrigerating fish-carrier B-68	-	-	-	-	-	-	-	-	-	-	1	7.8	3	24.2	3	24.2	3	24.2	3	24.3	3	24.3	4	32.4	4	32.4	4	32.4
Refrigerating fish-carrier B-361	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2.3	1	2.3	2	4.6	2	4.6
Sub-total	4	39.2	4	39.2	8	56.8	7	48.5	7	48.5	8	56.3	10	72.2	10	72.2	9	69.0	9	68.6	11	79.0	11	79.0	12	81.3	12	61.3
BALTIC - small trawlers owned by:																												
Government Enterprises	226	15.1	226	15.1	232	15.8	242	17.1	240	17.7	238	10.3	235	18.5	232	18.9	227	19.5	226	20.5	228	21.8	221	21.8	210	21.2	195	20.3
Fishery Cooperatives	143	6.5	116	5.6	116	5.6	115	5.6	115	5.6	114	5.5	115	5.8	115	5.9	117	6.0	117	6.2	117	6.4	122	6.7	117	6.4	117	6.4
Individual Fishermen	176	4.2	182	4.4	184	4.6	180	4.4	167	4.2	146	3.7	146	3.9	153	4.2	157	4.5	115	5.2	170	5.3	181	5.7	161	5.5	170	5.9
Sub-total	545	25.8	524	25.1	532	26.0	537	27.1	522	27.5	498	27.5	496	28.2	500	29.0	501	30.0	508	31.9	515	33.5	524	34.2	488	33.1	482	32.5
T O T A L	698	247.5	668	242.8	673	267.1	675	265.4	659	272.1	636	285.4	645	326.8	639	342.6	630	334.5	634	333.9	641	347.3	642	326.5	597	314.6	591	315.5

APPENDIX 2

THE COMPOSITION OF POLISH MARINE CATCHES AND THEIR DISTRIBUTION OVER THE MAIN FISHING AREAS IN THE YEARS: 1930 - 1983

in thous. metric tonnes (live-weight)

SPECIFICATION	1930	1935	1938	1945	1950	1955	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
PART A: SPECIES																						
Herring	0.3	5.0	9.9	0.4	9.5	52.0	93.6	124.1	128.2	136.2	108.7	114.8	112.6	118.9	84.9	60.8	63.8	77.1	69.6	65.4	90.7	82.3
Mackerel	-	-	-	-	1.7	1.7	6.9	6.3	76.6	126.5	160.4	130.9	125.9	120.7	82.7	28.5	11.1	35.6	4.3	5.6	4.7	5.2
Flatfish	0.9	0.8	0.4	0.5	0.8	1.8	1.7	9.8	37.9	37.2	35.4	32.2	25.8	23.9	18.4	14.6	14.9	1.3	1.2	6.5	6.5	9.2
Cod	0.1	0.5	1.6	1.6	48.2	40.3	51.1	66.2	126.7	92.9	101.2	81.7	73.0	87.7	99.2	115.2	116.8	105.6	126.0	122.4	84.6	77.0
Hake	-	-	-	-	-	-	-	-	-	-	-	94.2	160.1	144.7	182.8	83.9	79.5	120.9	195.8	102.8	13.9	15.5
Blue whiting	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.1	11.7	44.9	65.5	53.6	131.2	233.1
Alaska pollock	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42.2	64.4	95.4	-	-
Redfish	-	-	-	-	-	-	0.2	24.7	11.2	11.3	4.9	5.1	6.3	26.1	12.6	2.6	3.8	-	-	-	-	-
Sardines	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	175.7	43.2	85.9	49.5	-	-	-
Horse mackerel	-	-	-	-	-	-	-	-	9.3	10.2	12.4	20.9	24.0	40.6	58.7	79.6	157.1	121.6	97.2	120.1	102.7	130.4
Antarctic fish	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26.8	69.9	19.1	18.2	10.6	7.6	10.1
Sprats	1.6	10.4	0.1	-	1.2	5.1	9.9	17.0	20.2	31.9	38.9	49.9	62.0	71.9	66.5	50.5	28.6	13.3	16.1	11.4	15.8	8.6
Squids	-	-	-	-	-	-	-	-	-	-	-	9.6	-	-	-	6.9	6.4	26.3	13.7	19.7	109.4	110.2
Others	0.2	0.4	0.5	0.1	4.8	6.2	4.9	32.0	41.2	52.9	64.3	56.2	132.1	182.2	170.5	62.8	49.0	109.6	69.2	28.8	12.9	30.9
Total	3.1	17.1	12.5	2.6	66.2	107.1	168.3	280.1	451.3	499.1	526.8	595.5	721.8	816.7	776.3	709.4	655.8	803.4	790.7	642.3	580.0	712.5
PART B: AREAS																						
North-East Atlantic	-	4.2	10.0	-	7.7	41.7	85.2	114.7	57.0	53.3	57.6	56.8	117.1	120.0	124.5	26.7	29.5	18.5	13.9	6.6	3.8	0.9
North-West Atlantic	-	-	-	-	-	-	0.3	56.5	216.4	269.6	267.1	255.0	215.1	187.5	125.5	55.9	18.1	21.3	4.6	9.7	6.8	13.3
Central-East Atlantic	-	-	-	-	-	-	-	24.3	31.3	32.0	39.9	34.3	36.6	95.4	129.4	203.4	49.3	67.7	78.8	1.6	-	-
South-East Atlantic	-	-	-	-	-	-	-	-	-	-	4.0	49.9	61.8	76.2	113.0	134.6	164.1	112.6	72.7	123.0	97.7	114.1
South-West Atlantic	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	29.4	90.9	100.2	112.0	82.0	247.7	349.4
North-East Pacific	-	-	-	-	-	-	-	-	-	-	-	2.4	44.6	84.6	30.7	24.5	29.4	70.6	116.8	165.6	11.6	13.7
South-East Pacific	-	-	-	-	-	-	-	-	-	-	-	36.6	64.9	39.3	52.3	64.5	94.4	134.2	161.0	34.8	7.5	40.0
Other regions	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	5.4	91.9	9.2	9.4	8.0	7.0
Sub-total	-	4.2	10.0	-	7.7	41.7	85.8	195.5	304.7	354.9	368.6	435.0	540.1	603.0	576.0	539.4	481.1	617.0	569.0	432.7	379.5	538.4
Baltic	3.1	12.9	2.5	2.6	58.5	65.4	82.5	84.6	146.6	144.2	158.2	160.5	181.7	213.7	200.3	170.0	174.7	186.4	221.7	209.6	200.5	174.1
TOTAL	3.1	17.1	12.5	2.6	66.2	107.1	168.3	280.1	451.3	499.1	526.8	595.5	721.8	816.7	776.3	709.4	655.8	803.4	790.7	642.3	580.0	712.5

APPENDIX 3

LOCAL MARKET SUPPLY IN FINAL FISH PRODUCTS IN POLAND IN THE YEARS 1930 - 1983

(IN THOUSAND METRIC TONNES - PRODUCT WEIGHT)

	1930	1935	1938	1950	1955	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
1. Fresh and frozen fish products	15.1	15.7	23.4	7.2	9.3	16.9	24.1	45.9	42.6	40.6	41.6	36.8	31.4	45.5	50.3	60.9	66.7	73.3	68.1	63.0	50.8
2. Salted fish	76.1	40.4	54.8	24.8	30.5	66.8	48.4	37.3	38.6	37.1	34.4	35.0	35.7	35.1	29.6	25.8	29.5	29.3	16.0	12.7	25.6
3. Smoked fish	0.7	8.2	1.0	8.0	12.1	14.7	22.9	28.3	31.8	37.4	40.9	40.1	33.4	37.0	34.9	31.7	32.9	33.5	31.7	25.7	28.9
4. Fillets	-	-	-	-	2.9	3.5	6.4	16.9	13.1	15.6	16.8	22.5	27.2	24.9	19.9	15.9	17.2	30.0	30.3	15.9	36.3
5. Canned fish	-	-	-	3.0	2.2	11.0	21.5	25.0	29.9	32.6	39.4	42.8	45.5	53.1	52.8	48.7	50.0	50.0	36.4	18.4	31.4
6. Pickled fish	-	-	-	1.7	6.1	0.1	17.9	16.6	18.9	23.4	25.4	26.8	23.7	24.6	24.6	22.8	23.3	25.0	24.6	28.5	27.8
7. Ready-to-serve dishes	-	-	-	1.2	0.1	-	2.3	2.9	3.2	4.1	5.0	6.0	6.9	7.2	7.2	10.8	11.5	12.0	17.8	11.6	10.8
8. Other market fish products	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	-	0.1	0.1	0.1	1.9	1.2
Sub-total marine fish	91.9	64.3	79.2	45.9	63.1	113.0	133.5	172.9	178.3	190.8	203.5	210.0	203.8	227.4	219.4	216.6	231.2	253.2	225.0	177.7	212.8
9. Fresh-water fish	-	-	-	6.2	10.2	10.9	13.3	15.0	16.1	18.1	20.9	20.5	19.9	21.5	23.1	23.0	23.0	20.1	20.9	19.6	18.3
TOTAL SUPPLY	-	-	-	52.1	73.3	123.9	146.8	187.9	194.4	208.9	224.4	230.5	223.7	248.9	242.5	239.6	254.2	273.3	245.9	197.3	231.1

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$$\begin{array}{r} 115+13 \\ \hline 128 \end{array}$$